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Municipality of Singapore

Health Department

Annual Report

for

1929

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MUNICIPAL HEALTH OFFICE.

Singapore, 21st February, 1930.

The President,
Municipal Commissioners,
Singapore.

Sir,

I have the honour to submit my report for 1929.

I. ZYMOTIC DISEASES.

1,713 cases were notified compared with 1,520 in 1928 and 1294 in 1927.

The following table shows the comparison between the year under review and the previous ten years.

Year	Enteric Fever	Diphtheria	Chicken-pox	Puerperal Fever	Erysipelas	Cerebro Spinal Fever	Paratyphoid Fever	Small-pox	Plague	Cholera	Typhus Fever	Scarlet Fever	Tuberculosis	Total
1919 ..	174	42	34	14	3	22	3	14	11	75	—	—	866	1,258
1920 ..	129	33	68	15	1	29	2	4	61	33	—	—	520	895
1921 ..	127	49	119	13	11	70	4	150	28	1	—	—	319	891
1922 ..	68	52	127	16	7	32	2	268	39	1	—	—	169	781
1923 ..	63	37	188	12	14	9	1	3	52	—	—	—	409	788
1924 ..	64	38	230	22	9	16	—	9	20	11	—	—	331	750
1925 ..	136	51	31	14	2	10	2	10	59	1	—	—	365	681
1926 ..	197	46	169	25	14	6	1	34	7	22	1	1	642	1,165
1927 ..	235	29	193	22	5	17	7	19	4	30	—	—	733	1,294
1928 ..	230	59	350	11	8	15	12	9	5	9	1	3	808	1,520
Average for 10 years ..	142.3	43.6	150.9	16.1	7.4	22.6	3.4	52	28.6	18.3	.2	.4	516.2	1,002.3
1929 ..	133	57	577	13	8	3	—	9	3	—	—	6	904	1,713

The following table shows the incidence by Nationalities:—

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Enteric Fever ..	7	7	103	1	13	2	133
Diphtheria ..	3	13	34	2	4	1	57
Chicken-pox ..	5	11	46	18	486	11	577
Puerperal Fever ..	—	—	9	1	3	—	13
Erysipelas ..	—	1	6	—	1	—	8
C. Spinal Fever ..	—	—	2	—	1	—	3
Small-pox ..	3	1	5	—	—	—	9
Plague ..	—	—	2	—	1	—	3
Scarlet Fever ..	6	—	—	—	—	—	6
Tuberculosis ..	8	16	680	65	118	17	904
TOTAL ..	32	49	887	87	627	31	1,713

The following return shows the number notified for each month of the year:—

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Enteric Fever ..	9	8	8	9	15	4	13	15	16	8	13	15	133
Diphtheria ..	6	4	3	4	2	4	3	8	5	9	5	4	57
Chicken-pox ..	68	123	94	79	50	22	28	23	32	15	24	19	577
Puerperal Fever ..	—	2	3	1	1	2	1	—	2	—	—	1	13
Erysipelas ..	—	—	2	1	—	—	—	—	—	2	2	1	8
C. Spinal Fever ..	—	—	—	—	1	—	1	1	—	—	—	—	3
Small-pox ..	4	3	1	—	—	1	—	—	—	—	—	—	9
Plague ..	—	1	—	1	—	—	—	—	1	—	—	—	3
Scarlet Fever ..	—	1	—	3	2	—	—	—	—	—	—	—	6
Tuberculosis ..	54	66	62	75	91	66	80	71	93	85	82	79	904
TOTAL ..	141	208	173	173	162	99	126	118	149	119	126	119	1,713

These figures call for little comment. Though the numbers are higher than for the previous year, the bulk of the increase is due to Chicken-pox, a disease of little importance.

Our comparative freedom from the dangerous infectious diseases, Cholera, Small-pox and Plague, while a matter for congratulation, is to a large extent providential.

SMALL-POX.

There were 9 cases in all, 3 European, 1 Eurasian and 5 Chinese.

2 Europeans were officers on ships and were removed suffering from the disease, whilst the third European, a passenger, developed the disease within a day of arrival. The Eurasian case occurred in Rangoon Road. No connection could be made out between it and any other known case. Of the 5 Chinese cases, 3 developed the disease shortly after their arrival from Chinese ports. In all 3 cases the interval between their arrival and the date of onset of the disease was well within the incubation period. Of the remaining cases one was reported in Dunlop Street, and during investigations in connection with this case a partially recovered case was found in Tanjong Pagar Road. These two cases were related to each other and both worked in the same factory. Undoubtedly one infected the other, but no trace of the original infection could be found. Both patients insisted they had been in Singapore for some time.

PLAGUE.

All 3 cases were found after death. One was found in Omar Road on 22/2/29. It was diagnoised plague by the Government Pathologist. The second was found in a house in Bencoolen Street on 27/4/29. It was diagnoised plague from the post-mortem appearances but was not confirmed bacteriologically. In all probability it was not a case of plague. The third case was found in the Paya Lebar district and was confirmed as plague by the Government Pathologist. There was no evidence of rat plague at any time throughout the year. It was extremely difficult therefore to account for the two cases above, which were reported confirmed.

ENTERIC.

133 cases were reported but 89 deaths were due to this cause. Though we know, therefore, there must have been many more cases than those notified. still the figures show a big improvement on those of 1928. These were, 230 notifications, with 137 deaths.

TUBERCULOSIS.

904 cases were notified but 1,500 deaths were reported as due to this cause. The corresponding figures for 1928 were 808 notifications with 1,411 deaths.

DIPHTHERIA.

Once again I quote Dr. Gilmour who last year stressed the need for the education of the public as to the dangers of this disease. In his annual report of the Middleton Hospital he says—"19 of the admissions (50%) were laryngeal, of whom 10 required immediate tracheotomy and 7 died, 4 within an hour of operation. In all the fatal cases a history of illness of from 5 to 14 days was given and it is difficult to understand how children could be allowed to get into the condition some of them were in, without its being apparent they were desperately ill." And further on he remarks—"There must be very many cases of diphtheria here unrecognised to have given rise to 19 laryngeal cases in the practice of the hospital."

I have long held the view that perhaps many of the deaths in children at present loosely certified as being due to convulsions may really be cases of Diphtheria. With a view to testing this theory instructions were given late in the year, December, to be exact, to the Inspecting Registrars that in all cases of deaths of children under 10 years, a throat swab must be taken and sent to the bacteriological laboratory for examination.

Though naturally at this early stage I cannot draw any conclusion, the results so far as they go are significant. From about the middle of December to the date of writing, 22nd January, 53 throat swabs have been so examined. The Diphtheria bacillus was found in 6 of them. Several of these 6 were certified as having died from "Convulsions."

SCARLET FEVER.

There were 6 cases of this disease, all European, and all connected with the Military. One was admitted from H. M. T. Somersetshire on her arrival in port, while the other 5 were children from the Barracks.

GENERAL.

(1) Medical Inspection of Passengers.

254 permits to land were granted to 322 passengers, 92 of whom failed to report for examination. Many of the culprits were contacts from Siam during the Cholera epidemic. Though they gave Singapore as their destination it is quite likely many of them never came here. At any rate none of them could be traced. The introduction at the frontier of a system of a compulsory deposit resulted in a marked improvement.

(2) Disinfection of Infected Articles.

902 articles were disinfected. The steam disinfector was used on 12 occasions and the sack disinfector on 4 occasions.

(3) Houses Quarantined and Disinfected.

6 houses were quarantined, all being released by the end of April. 1,015 houses (Phthisis cases 355) were disinfected.

(4) Infected Persons and Contacts.

454 persons were removed to hospital, 5 bodies were removed for autopsy, 19 bodies were buried under supervision and 12 contacts were sent to St. Johns Island for quarantine.

II. MIDDLETON HOSPITAL.

At the end of 1928 there were 30 patients remaining in hospital while during 1929 there were 806 admissions giving a total treated of 836. Of these, 796 were discharged, 25 died while 15 remained in hospital at the end of the year. 553 of the patients treated were cases of Chickenpox while 15 of the deaths were due to Diphtheria.

The report of Dr. Gilmour, the Medical Superintendent, is appended. His remarks on the prevalence of Diphtheria, already referred to, are worthy of study.

III. VACCINATION.

The following vaccinations were reported.

	Successful	Modified	Failed	Not Seen	Total
Municipal Vaccinators ..	9,319	207	286	362	10,174
Private Vaccinators ..	2,121	4	7	6	2,138
Medicalmen ...	2,753	—	4	—	2,757
TOTAL ..	14,193	211	297	368	15,069

Of the total number of 10,174 vaccinations performed by the Municipal Vaccinators 91.6% were successful.

The nationalities of those vaccinated were:—Europeans 16, Eurasians 208, Chinese 8,640, Malays 501, Indians 640, Others 169. Of these 5,831 were males and 4,343 females of the following ages:—

Under 1 year of age	7,390
Between 1 and 2 years	526
,, 2 ,, 5 ,, ...	386
,, 5 ,, 10 ,, ...	1,479
,, 10 ,, 20 ,, ...	92
Adults	301
	10,174

At Municipal Vaccination depôts there were performed 6,434 vaccinations, at Police Stations 1,358, in houses 1,144, in Schools 1,031 and of contacts 207.

3,010 tubes of lymph were used by the Municipal Vaccinators. being equivalent to an average of 3.4 per tube.

In the year 1928 there were 15,540 births and in 1929 there were 17,551, The half of the total of these two figures, 16,550 approximately, may be taken to be the number to be vaccinated during 1929. Also during the year there were 3,467 deaths of infants under one year of age. As 1,844 of these were under three months when they died, we may safely assume, I think, that two thirds of the total number who died were not vaccinated—say 2,300. If we substract this from the figure above we are left with 14,250, which we may take to be reasonably accurate for the numbers of infants to be vaccinated.

Municipal Vaccinators vaccinated 7,390 infants. Private Practitioners and Vaccinators between them performed 4,895 vaccinations, practically all of them most likely on infants. This means that a total of 12,285 infants were vaccinated as against a total possible of 14,250. Emigration, and failure to report on the part of the Medical Practitioners will account for many of the 2,000 who appear to have been missed so that I think we can rest assured that primary vaccination is now being fairly efficiently carried out.

IV. VITAL STATISTICS.

The following statistics are calculated on an estimated mean annual population of 479,723 made up as follows:—

	Males	Females	Total
Europeans	3,294	1,619	4,913
Eurasians	2,952	3,326	6,278
Chinese	242,383	133,326	375,709
Malays	23,381	20,984	44,365
Indians	32,930	6,978	39,908
Others	4,810	3,740	8,550
TOTAL ..	309,750	169,973	479,723

The following return gives the population, the number and rates per 1,000 births, infantile deaths at all ages for the past 10 years:—

Year	Population	Births		Infantile Deaths		Death at all ages	
		No.	Rate	No.	Rate	No.	Rate
1919 ..	321,430	8,535	26.54	2,234	251.7	10,756	33.45
1920 .	330 303	8,969	27.15	2,233	248.9	11,731	35.51
1921 ..	351,461	10,237	29.12	2,383	232.7	11,947	33.99
1922 .	362,597	10,368	28.59	2,488	239.9	11,553	31.86
1923 ..	373 513	10,757	28.79	2,431	225.9	10,049	26.90
1924 ..	384,758	11,757	30.55	2,614	222.3	10,420	27.08
1925 ..	396,341	12,363	31.19	2,600	210.3	11,184	28.21
1926 ..	408,273	12,871	31.52	2,987	232.0	13,085	32.04
1927 ..	428,153	14,152	33.05	3,221	227.6	14,165	33.08
1928 ..	442,454	15,540	35.12	3,142	202.1	12,584	28.44
Average for 10 years ..	379,933	11,554	30.16	2,633	229.3	11,747	31.05
1929 ..	479,723	17,551	36.58	3,467	197.5	12,575	26.21

I. BIRTHS.

The total number of births registered during the year was 17,551 compared with 15,540 in 1928 and 14,152 in 1927.

There were 9301 male and 8250 female births.

The birth rate was 36.59 per mille as compared with 35.12 in 1928 and 33.05 in 1927.

The birth rate is the highest recorded.

The following return gives the number of births and the birth rate for each month of the year.

MONTH	Births	Birth Rate	MONTH	Births	Birth Rate
January ..	1,377	34.44	July ..	1,476	36.92
February ..	1,280	32.02	August ..	1,438	35.97
March ..	1,342	33.57	September ..	1,426	35.67
April ..	1,428	35.72	October ..	1,600	40.02
May ..	1,516	37.92	November ..	1,709	42.75
June ..	1,411	35.30	December ..	1,548	38.72

The following return shows the number of births and birth rate for each nationality:—

	Males	Females	Total	Birth Rate
Europeans	60	59	119	24.22
Eurasians	100	101	201	32.02
Chinese	7,681	6,689	14,370	38.25
Malays	891	848	1,739	39.20
Indians	447	432	879	22.03
Others	122	121	243	28.42
TOTAL ..	9,301	8,250	17,551	36.59

There were 547 Still Births compared with 507 in 1928 and 448 in 1927.

II. DEATHS.

The total number of deaths for the year was 12,575 and the death rate 26.21 per 1,000 compared with 28.44 in 1928 and 33.08 in 1927.

626 persons died who had been less than 3 months resident in Singapore. Deducting these the death rate is reduced to 24.91.

The excess of births over deaths was 4,976.

The following return gives the number of deaths and the death rate for each month of the year:—

MONTH	Deaths	Death Rate	MONTH	Deaths	Death Rate
January ..	1,024	25.61	July ..	1,200	30.02
February ..	842	21.06	August ..	1,002	25.06
March ..	998	23.96	September ..	1,021	25.54
April ..	977	24.44	October ..	1,108	27.72
May ..	1,164	29.12	November ..	1,056	26.42
June ..	1,113	27.84	December ..	1,070	26.77

The death rates for the different nationalities were:—

	1929			1928		
	Males	Females	Total	Males	Females	Total
Europeans	10.63	9.88	10.38	14.12	8.86	12.40
Eurasians	17.28	13.83	15.45	19.75	17.02	18.29
Chinese	28.57	24.95	27.29	31.42	25.73	29.44
Malays	26.60	25.78	26.21	29.51	27.58	28.61
Indians	19.22	36.11	22.18	22.70	40.70	25.65
Others	17.26	11.76	14.85	13.55	10.35	12.13
TOTAL ..	26.95	24.86	26.21	29.80	25.86	28.44

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

I. General Diseases.			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown.		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
1. Enteric Fever,	1a. Typhoid Fever.		..	..	..	..	1	..	..	1	2	3	1	1	25	2	28	3	10	3	7	..	2	..	..	..	M F	76 13	89
	1b. Paratyphoid fever.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
2. Typhus Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
3. Relapsing Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
4. Mediterranean Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
5. Malaria.			1	..	7	5	15	18	19	27	24	14	63	10	136	23	278	57	187	30	97	25	31	13	..	..	M F	858 222	1,080
6. Small-pox.			..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	2 0	2
7. Measles.			..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 2	3
8. Scarlet Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
9. Whooping Cough.			..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 1	2
10. Diphtheria.			1	1	..	1	1	9	1	3	2	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	7 14	21
11. Influenza,	11a. With pulmonary complications,	(1) With pneumonic complications.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
		(2) With other pulmonary complications.	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	11b. Without pulmonary complications,	(1) With non-pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Without stated complications.	2	1	7	10	5	5	3	3	2	3	1	2	3	1	6	1	5	2	6	4	7	7	..	..	M F	47 39	86
12. Miliary Fever.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
13. Mumps.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	4	2	15	17	24	34	23	34	30	20	66	13	164	26	315	61	202	35	110	29	40	20	..	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

I. General Diseases—(contd.)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	4	2	15	17	24	34	23	34	30	20	66	13	164	26	315	61	202	35	110	29	40	20	..	..			
14. Asiatic Cholera.			..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
15. Cholera nostras.			..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
16. Dysentery,	16a. Amœbic.		..	..	..	1	2	1	..	.	.	..	1	..	8	..	32	4	20	3	20	2	6	5	..	..	M F	89 16	105
	16b. Bacillary.		..	..	..	..	1	..	1	.	.	1	..	..	5	1	15	3	23	2	13	..	2	1	..	..	M F	60 8	68
	16c. Other or Unspecified.		2	..	..	2	8	3	3	3	2	1	5	1	10	3	31	5	50	10	58	15	40	20	..	..	M F	209 66	275
17. Plague,	17a. Bubonic.		..	..	..	..	1	..	..	.	..	..	..	..	..	..	1	.	1	..	..	..	..	..	..	..	M F	3 0	3
	17b. Pneumonic.		..	..	..	..	..	..	..	.	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17c. Septicæmic.		..	..	..	..	..	..	..		..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17d. Not otherwise defined.		..	..	..	..	..	..	..			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
18. Yellow Fever.			..	..	..	..	..	..	..		.	..	..	..	..	..	..		..	..	..	..	..	..	..	..	M F	0 0	0
19. Spirochaetosis ictero—haemorrhagica.			..	..	..	..	..	..	..	..		..	..	..	..	..	..		..	..	..	..	..	..	..	..	M F	0 0	0
20. Leprosy.			..	..	..	..	..	..	..	..	..	..	..	..	1	1	3	[illegible]	1	1	2	2	..	1	..	..	M F	7 7	14
21. Erysipelas.			..	..	..	..	..	..	..		..	..	..	..	..	..	1	..	2	..	1	..	1	..	..	..	M F	5 0	5
22. Acute Poliomyelitis.	(1) Acute poliomyelitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Acute poliencephalitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
23. Encephalitis lethargica.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
24. Meningococcal meningitis.			1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	3 0	3
		Carried forward ..	7	2	16	20	36	38	27	37	32	22	72	14	189	31	398	78	300	51	201	48	89	47	..	..			

I. General Diseases—(contd.)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	7	2	16	20	36	38	27	37	32	22	72	14	189	31	398	78	300	51	204	48	89	47	..	..			
25. Other epidemic and endemic diseases,	(1) German Measles.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Varicella.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 25.		..	..	..	..	..	..	..	..	..	..	1	1	..	..	2	..	1	..	1	..	..	..	..	..	M F	5 1	6
26. Glanders.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
27. Anthrax.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
28. Rabies.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
29. Tetanus.			26	21	..	1	..	..	..	..	2	..	..	..	2	..	1	..	2	..	1	..	1	1	..	..	M F	35 23	58
30. Mycoses.	(1) Actinomycosis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other mycoses.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	M F	1 1	2
31. Tuberculosis of the respiratory system.			..	..	..	..	9	10	6	5	2	1	20	12	67	32	261	90	302	79	276	58	121	22	..	..	M F	1,067 309	1,376
32. Tuberculosis of the central nervous system.			3	2	4	3	6	10	..	..	2	..	1	2	3	..	2	..	2	..	1	..	..	..	..	..	M F	24 17	41
33. Tuberculosis of intestines and peritoneum.			..	..	1	..	1	4	..	1	..	1	..	..	1	1	..	4	..	..	..	..	..	1	..	..	M F	3 12	15
34. Tuberculosis of vertebral column.			..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	2 0	2
35. Tuberculosis of joints.			..	..	..	..	..	1	1	..	1	1	1	..	1	..	1		..	2	..	..	..	..	..	..	M F	5 4	9
36. Tuberculosis of other organs.	a. Skin and subcutaneous tissues.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Bones.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
	c. Lymphatic system.		1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	2 0	2
		Carried forward ..	37	25	21	24	54	63	34	43	39	25	95	29	263	64	666	172	608	133	484	106	214	71	..	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

I. General Diseases—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	37	25	21	24	54	63	34	43	39	25	95	29	263	64	666	172	608	133	484	106	214	71	..	..			
	d. Genito-Urinary system.		..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
	e. Other sites included under 36.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
37. Disseminated tuberculosis,	a. Acute.		..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	2	3	..	1	..	..	..	..	..	M F	5 4	9
	b. Chronic or unstated.		..	..	5	3	8	8	5	3	5	..	2	..	..	..	1	..	1	..	3	..	..	..	..	..	M F	30 14	44
38. Syphilis.			16	11	5	7	1	3	..	1	..	..	..	..	3	3	15	4	26	3	17	2	6	3	..	..	M F	89 37	126
39. Soft chancre.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
40. Gonococcal Infection,	(1) Gonococcal infection except ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..	..	..	..	M F	2 1	3
	(2) Gonorrhœal or purulent ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
41. Purulent infection, Septicaemia.			8	11	8	9	6	4	..	1	..	..	2	..	4	..	18	1	13	1	5	2	8	1	1	..	M F	73 30	103
42. Other infectious diseases,	(1) Vaccinia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 42.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
II. General Diseases not included above.																													
43. Cancer of the buccal cavity.			..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	3	2	2	..	..	M F	4 6	10
44. Cancer of the pharynx, etc.			..	..	..	..	..	..	..	..	..	..	1	..	3	..	4	..	22	3	32	9	27	6	..	..	M F	89 18	107
45. Cancer of the peritoneum, intestines and rectum.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	4	1	..	..	M F	4 2	6
46. Cancer of the female genital organs.			..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	7	..	3	..	8	..	..	M F	0 20	20
47. Cancer of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	3	..	2	..	..	M F	0 10	10
48. Cancer of the skin.			..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	1	1	..	..	M F	2 3	5
		Carried forward ..	61	47	39	43	69	78	39	48	44	26	102	31	273	69	706	181	675	153	543	129	262	95	1	..			

II. General Diseases not included above—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	61	47	89	48	69	78	39	43	44	26	102	31	273	69	706	181	675	153	543	129	262	95	1	..			
49. Cancer of other or unspecified organs.			..	..	..	..	1	..	1	..	..	..	2	..	2	..	3	2	7	1	8	2	6	2	..	..	M F	30 7	37
50. Tumours not returned as malignant.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..	M F	2 1	3
51. Rheumatic Fever.			..	..	..	..	1	..	..	..	..	..	..	1	1	..	1	..	..	..	..	..	1	..	..	..	M F	4 1	5
52. Chronic rheumatism, Osteo-arthritis, Gout,	(1) Chronic rheumatism chronic arthritis.		..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2	1	4	2	2	1	..	..	M F	8 5	13
	(2) Rheumatoid arthritis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..	M F	2 1	3
	(3) Gout.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
53. Scurvy.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
54. Pellagra.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
55. Beri-beri.			..	..	..	..	..	1	1	..	3	2	19	4	72	14	185	50	152	37	91	22	38	10	..	..	M F	561 140	701
56. Rickets.			..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
57. Diabetes.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2	..	5	1	6	10	..	..	M F	14 12	26
58. Anaemia, Chlorosis,	a. Pernicious anæmia.		..	..	..	..	..	..	1	..	..	..	1	..	1	..	..	3	..	1	1	1	..	..	..	..	M F	4 5	9
	b. Other anæmia and chlorosis.		..	..	..	..	3	..	1	2	1	..	1	..	1	..	3	3	1	2	..	..	..	..	..	..	M F	11 7	18
59. Diseases of the pituitary gland.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
60. Diseases of the thyroid gland,	a. Exophthalmic goitre.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	M F	1 2	3
	b. Other diseases of the thyroid gland,	(1) Myxœdema.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Cretinism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	61	48	89	48	74	79	43	51	43	28	125	36	351	83	899	241	839	196	656	159	315	118	1	..			..

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

II. General Diseases not included above—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	61	48	39	43	74	79	43	51	48	28	125	36	351	83	899	241	839	196	656	159	315	118	1	..			
		(3) Other diseases included under 60b.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
61. Diseases of the parathyroid glands,	(1) Tetany.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases of the parathyroid glands.		..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
62. Diseases of the thymus.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
63. Diseases of the adrenals.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
64. Diseases of the spleen.			..	..	..	..	..	..	1	..	..	..	1	..	..	..	5	..	3	..	..	..	..	..	..	..	M F	10 0	10
65. Leukaemia, Lyphadenoma,	a. Leukæmia.		..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	2 0	2
	b. Lymphadenoma.		..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 1	2
66. Alcoholism.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
67. Chronic poisoning by mineral substances,	(1) Occupational lead poisoning.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other chronic poisoning by mineral substances.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
68. Chronic poisoning by organic substances.			..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	M F	2 0	2
69. Other general diseases,	(1) Purpura.		1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	3 .0	3
	(2) Hæmophilia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 69.		..	..	5	2	5	3	..	1	..	..	..	..	1	..	..	2	..	..	1	..	2	..	..	..	M F	14 8	22
III. Diseases of the Nervous System and Sense Organs.																													
70. Encephalitis.	(1) Cerebral abscess.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	M F	2 0	2
	(2) Other diseases included		..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	62	48	44	45	80	83	44	52	48	28	127	36	351	83	904	243	844	196	661	159	319	118	1	..			
71. Meningitis.			3	1	2	1	2	2	1	..	1	..	..	1	4	..	5	..	4	..	4	..	2	1	..	..	M F	28 6	34
72. Tabes dorsalis.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
73. Other diseases of the spinal cord.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	1	..	..	..	..	..	M F	3 1	4
74. Cerebral haemorrhage, Apoplexy, etc.,	a. Cerebral hæmorrhage.	(1) Cerebral hæmorrhage so returned.	5	2	..	..	..	..	..	..	.	..	..	..	2	..	4	..	6	2	14	6	25	19	..	..	M F	56 29	85
		(2) Apoplexy (lesion unstated).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	2	4	3	10	6	..	..	M F	19 11	30
	b. Cerebral thrombosis and embolism,	(1) Cerebral embolism.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	M F	1 2	3
		(2) Cerebral thrombosis.	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	2 0	2
75. Paralysis of unstated origin,	a. Hemiplegia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	2	1	2	2	..	..	M F	6 3	9
	b. Other forms of paralysis.		..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	2	3	2	3	1	5	1	..	..	M F	13 6	19
76. General paralysis of the insane.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
77. Other forms of insanity.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
78. Epilepsy.			..	..	..	..	..	1	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 3	3
79. Convulsions (non puerperal 5 years and over).			..	..	..	..	..	..	4	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	4 8	12
80. Infantile convulsions (under 5 years of age).			329	278	274	192	92	83	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	695 553	1,248
81. Cholera.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	M F	0 0	0
82. Hysteria and neuritis.	(1) Hysteria, Neuralgia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
	(2) Neuritis.		..	..	..	..	..	..	..	..	..	..	..	3	..	1	2	7	..	..	4	4	5	5	..	..	M F	11 20	31
		Carried forward ..	399	329	320	238	175	169	49	60	49	29	128	40	360	85	916	254	867	203	694	174	369	153	1	..			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	399	329	320	238	175	169	49	60	49	29	123	40	360	85	916	254	867	203	694	174	369	153	1	..			
83. Cerebral softening.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
84. Other diseases of the nervous system,	(1) Idiocy, Imbecility.		..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
	(2) Cerebral tumour.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	..	..	..	..	..	..	..	M F	4 1	5
	(3) Disseminated sclerosis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(4) Paralysis agitans.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
	(5) Other diseases included under 84.		..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
85. Diseases of the eye and annexa.			..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
86. Diseases of the ear and mastoid sinus,	(1) Diseases of the mastoid sinus.		..	..	..	1	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 2	3
	(2) Diseases of the ear.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IV. Diseases of the Circulatory System.																													
87. Pericarditis.			..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	2	2	..	1	..	..	..	..	..	M F	4 3	7
88. Acute endocarditis and myocarditis,	(1) Malignant endocarditis.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	4	..	2	..	1	..	..	..	..	..	M F	7 1	8
	(2) Other acute endocarditis.		..	..	..	..	..	..	..	..	..	..	..	1	3	1	7	..	7	1	..	..	2	..	..	..	M F	19 3	22
	(3) Acute myocarditis.		..	..	..	..	..	..	..	..	..	..	1	..	3	1	15	4	16	3	1	..	..	..	..	..	M F	36 8	44
89. Angina pectoris.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	M F	3 0	3
90. Other diseases of the heart,	(1) Aortic valve disease.		..	..	..	..	..	..	..	..	..	..	1	..	..	2	5	5	10	7	24	6	22	8	..	..	M F	62 28	90
	(2) Mitral valve disease.		..	..	..	..	..	..	..	..	..	1	..	1	..	..	1	..	1	2	2	2	1	..	..	..	M F	5 6	11
	(3) Aortic and mitral valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
		Carried forward ..	399	329	320	239	176	170	49	61	49	31	131	43	367	90	950	266	910	217	726	183	395	161	1	..			

IV. Diseases of the Circulatory System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	399	329	320	239	176	170	49	61	49	31	131	43	367	90	950	266	910	217	726	183	395	161	1	..			
	(4) Other or unspecified valve disease.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	2	2	..	..	M F	5 2	7
	(5) Fatty heart.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	..	M F	2 1	3
	(6) Dilatation of heart (cause unspecified).		..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..	3	..	1	1	..	..	..	..	M F	6 2	8
	(7) Other or unspecified myocardial disease.		..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	1	1	11	1	11	6	..	1	M F	25 10	35
	(8) Disordered action of heart.		..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	M F	2 1	3
	(9) Heart disease (undefined).		..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	3	1	1	1	..	..	M F	6 3	9
91. Diseases of the arteries,	a. Aneurysm.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	3	..	..	..	..	..	M F	5 0	5
	b. Arterio-sclerosis,	(1) Asterio sclerosis with record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	3	9	6	..	..	M F	12 9	21
		(2) Arterio sclerosis without record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Other diseases of the arteries.		..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	4	..	2	..	2	1	..	..	M F	9 1	10
92. Embolism and thrombosis (not cerbral).			..	..	..	..	..	..	..	..	..	..	..	2	..	1	1	4	..	6	..	..	..	1	..	..	M F	1 14	15
93. Diseases of the veins (Varix. hæmorrhoids, phlebitis, etc.)			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	0 1	1
94. Diseases of the lymphatic system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
95. Hæmorrhage without stated cause.			..	..	..	..	..	..	1	..	..	..	..	..	..	..	5	1	1	1	..	..	..	..	..	..	M F	7 2	9
96. Other diseases of the circulatory system.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	M F	2 0	2
V. Diseases of the Respiratory System.																													
97. Diseases of the nasal fossæ and annexa,	(1) Diseases of the nose.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Diseases of the accessory nasal sinuses.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	399	329	320	239	176	170	50	62	50	31	132	45	369	92	961	273	923	225	752	189	422	180	1	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

V. Diseases of the Respiratory System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	399	329	320	239	176	170	50	62	50	31	132	45	369	92	961	273	923	225	752	189	422	180	1	1			
98. Diseases of the Larynx,	(1) Laryngismus stridulus		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Laryngitis.		..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	1 2	3
	(3) Other diseases of the larynx.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
99. Bronchitis,	a. Acute bronchitis.		1	4	2	5	3	2	1	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	M F	9 11	20
	b. Chronic bronchitis.		..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	1	2	2	..	2	4	2	..	..	M F	7 9	16
	c. & d. Bronchitis not distinguished as acute or chronic.		16	11	47	42	39	28	5	6	..	1	..	..	1	..	3	1	3	1	2	3	14	4	..	..	M F	130 97	227
100. Broncho-pneumonia			54	35	161	120	187	138	50	37	5	6	9	3	16	3	27	5	29	2	16	5	12	4	..	..	M F	566 358	924
101. Pneumonia, lobar, or not otherwise defined,	a. Lobar pneumonia.		6	4	16	16	15	14	4	2	..	1	12	3	43	6	83	10	94	14	69	4	21	9	..	..	M F	363 83	446
	b. Pneumonia not otherwise defined.		6	8	22	11	22	15	11	15	2	2	18	8	28	7	52	22	52	13	51	9	18	8	..	..	M F	282 118	400
102. Pleurisy,	1. Empyema.		..	..	..	1	..	1	..	..	..	..	1	..	..	..	3	..	2	..	1	..	..	..	..	..	M F	7 2	9
	2. Other pleurisy.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	M F	1 1	2
103. Congestion and hæmorrhage infarct of lung.			..	..	..	..	..	1	..	..	..	..	1	..	1	..	2	1	3	..	..	..	..	..	..	..	M F	7 2	9
104. Gangrene of the lung.			..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	3	..	3	..	..	..	..	..	M F	8 0	8
105. Asthma.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	3	2	10	4	7	6	..	..	M F	22 13	35
106. Pulmonary emphysema.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
107. Other diseases of the respiratory system,	a. Chronic interstitial pneumonia including occupational diseases of the lung.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	b. Diseases of the		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1

V. Diseases of the Respiratory System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	482	392	568	434	444	371	122	122	57	41	173	59	458	108	1,135	315	1,116	260	905	216	498	214	1	1			
	c. Other diseases included under 107.		1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	3	..	..	..	M F	6 1	7
VI. Diseases of the Digestive System.																													
108. Diseases of the buccal cavity and annexa,	(1) Diseases of the teeth and gums.		..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	2 1	3
	(2) Ludwigs angina.		..	1	1	1	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	M F	4 2	6
	(3) Other diseases included under 108.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
109. Diseases of the pharynx and tonsils,	(1) Tonsillitis, Adenoid Vegetations.		..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 3	4
	(2) Other diseases included under 109.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
110. Diseases of the œsophagus.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
111. Ulcer of the stomach or duodenum,	a. Ulcer of the stomach.		..	..	..	..	..	..	..	..	..	2	..	1	2	..	4	1	8	1	7	..	4	3	..	..	M F	25 8	33
	b. Ulcer of the duodenum.		..	..	..	..	..	..	..	..	..	..	..	1	..	..	2	..	..	..	3	..	..	..	..	..	M F	5 1	6
112. Other diseases of the stomach,	1. Inflammation of the stomach.		25	24	41	27	11	10	..	1	..	..	..	..	..	..	1	1	2	1	1	2	2	1	..	..	M F	83 67	150
	2. Other diseases included under 112.		..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	2	..	..	M F	1 5	6
113. and 114. Diarrhœa and enteritis,	(1) Ulceration of the intestines.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Colitis.		6	3	7	8	10	5	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	M F	25 18	43
	(3) Other diseases included under 113 and 114		129	89	205	160	86	88	4	3	1	..	1	..	2	..	1	..	4	2	4	..	7	1	..	..	M F	444 343	787
115. Ankylostomiasis.			..	..	..	..	1	2	1	4	1	..	..	1	1	4	2	6	1	5	1	1	..	..	..	..	M F	8 23	31
116. Diseases due to other intestinal parasites.	a. Cestodes, (hydatids of liver excepted).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Trematodes.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward ..	643	510	822	630	554	477	128	134	60	43	175	62	463	112	1,146	324	1,134	270	922	220	516	222	1	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

VI. Diseases of the Digestive System—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		SEX	TOTALS	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	643	510	822	630	554	477	128	134	60	43	175	62	463	112	1,146	324	1,134	270	922	220	516	222	1	1			
	c. Nematodes other than Ankylostoma.		..	..	1	1	2	5	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	4 6	10
	d. Coccidia.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other specified parasites in 116.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	f. Undefined intestinal parasites.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
117. Appendicitis.			..	..	..	..	1	..	..	..	1	..	..	..	1	..	5	..	1	..	4	..	1	..	..	..	M F	14 0	14
118. Hernia, Istestinal obstruction.	a. Hernia.		..	..	..	..	1	..	..	..	..	..	1	..	2	..	2	..	6	..	3	..	2	..	..	..	M F	17 0	17
	b. Intestinal obstruction		1	..	2	..	1	..	..	..	1	..	..	1	..	..	1	..	2	..	2	..	1	..	..	..	M F	11 1	12
119. Other diseases of the intestiness.	1. Intestinal stasis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other diseases included under 119.		..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 1	2
120. Acute yellow atrophy of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
121. Hydatid tumour of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
122. Cirrhosis of the liver.	(1) Returned as alcholic.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	4	..	1	..	..	..	M F	7 1	8
	(2) Not returned as alcoholic.		..	..	..	..	..	..	1	..	..	..	..	..	2	..	9	3	26	2	19	..	4	5	..	..	M F	61 10	71
123. Biliary Calculi.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
124. Other diseases of the liver.			1	2	..	..	..	..	..	..	..	..	..	..	5	..	11	..	5	2	8	..	6	..	..	..	M F	36 4	40
125. Diseases of the pancreas.			..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	1	..	..	..	..	M F	2 1	3
126. Peritonitis without stated cause.			..	..	1	1	..	..	..	..	1	..	1	..	3	..	4	2	6	2	7	1	2	1	..	..	M F	25 7	32

VI. Diseases of the Digestive System—(*contd.*)			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	645	512	826	633	560	482	130	134	63	43	177	63	477	112	1,179	330	1,182	277	969	222	533	228	1	1			
127.	Other diseases of the digestive system.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.																													
128.	Acute nephritis. (Including unspecified under 10 years of age).		2	..	1	..	7	4	7	4	2	..	..	..	3	3	7	[illegible]	4	4	8	6	4	1	..	..	M F	45 28	73
129.	Chronic nephritis. (Including unspecified over 10 years of age).		..	..	..	..	..	..	..	1	4	2	6	4	6	14	31	39	43	23	91	48	101	66	..	..	M F	282 197	479
130.	Chyluria.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	9
131.	Other diseases of the kidney and annexa.		..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	[illegible]	4	..	5	1	1	..	..	..	M F	12 4	16
132.	Calculi of the urinary passages.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
133.	Diseases of the bladder.	1. Cystitis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	3	..	3	..	..	..	M F	9 0	9
		2. Other diseases of the bladder.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	1	..	..	..	..	..	..	..	M F	1 0	1
134.	Diseases of the urethra, urinary abscess, etc.	a. Stricture of the urethra, etc.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	M F	0 0	0
		b. Other diseases of the urethra.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..	..	..	..	1	..	..	..	M F	1 0	1
135.	Diseases of the prostrate.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
136.	Non-venereal diseases of the male genital organs.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
137.	Cysts, and other tumours of the ovary not returned as malignant.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	2	..	1	..	..	M F	0 5	5
138.	Salpingitis and pelvic abscess in females.	1. Salpingitis.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	M F	0 0	0
		2. Pelvic abscess in females.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	M F	0 0	0
139.	Tumours of the uterus not returned as malignant.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
140.	Non-puerperal uterine-hæmorrhage.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	647	512	827	633	567	486	137	139	70	45	183	67	487	129	1,218	379	1,237	305	1,076	279	644	296	1	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	617	512	827	633	567	486	137	139	70	45	183	67	487	129	1,218	379	1,237	305	1,076	279	644	296	1	1			
141. Other diseases of the female genital organs,	1. Other diseases of the uterus.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	M F	0 2	2
	2. Diseases of the female genital organs not included under other headings.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
142. Non-puerperal diseases of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
VIII. The Puerperal State.																													
143. Accidents of pregnancy,	a. Abortion.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Ectopic gestation.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Other accidents of pregnancy.		..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	2	..	..	..	..	..	..	M F	0 4	4
144. Puerperal Hæmorrhage.			..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	9	..	4	..	1	..	..	..	..	M F	0 16	16
145. Other accidents of childbirth.			..	..	..	..	..	..	..	..	..	..	..	..	..	9	..	14	..	9	..	1	..	..	..	..	M F	0 33	33
146. Puerperal sepsis.			..	..	..	..	..	..	..	..	..	..	..	2	..	3	..	9	..	4	..	..	..	..	..	..	M F	0 18	18
147. Puerperal phlegmasia alba dolens, embolism and sudden death,	1. Puerperal phlegmasia alba dolens not returned as septic		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
	2. Puerperal embolism and sudden death.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
148. Puerperal albuminuria and convulsions.			..	..	..	..	..	..	..	..	..	..	..	3	..	2	..	9	..	2	..	..	..	..	..	..	M F	0 16	16
149. Childbirth not assignable to other headings (puerperal insanity).			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
150. Puerperal diseases of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IX. Diseases of the Skin and Cellular Tissue.																													
151. Gangrene.	1. Senile gangrene, (aged 60 and over).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	M F	0 2	2
	2. Other gangrene.		..	..	..	..	3	1	..	1	..	..	..	1	..	..	2	..	3	..	2	2	..	1	..	..	M F	10 6	16
152. Carbuncle, boil.			2	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	1	1	..	..	M F	4 7	11
		Carried forward																											

IX. Diseases of the Skin and Cellular Tissue—*(contd.)*			3 Months		Months		Years		Years		Years		Years		Years		Years		Years		Years		55				Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	649	513	827	636	570	487	137	140	70	45	183	75	487	147	1,220	422	1,240	326	1,079	285	645	300	1	1			
153. Cellulitis, acute abscess,	1. Cellulitis.		1	2	..	1	1	..	..	..	..	1	1	1	..	..	1	1	1	..	1	..	1	..	..	..	M F	7 6	13
	2. Acute abscess.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
154. Other diseases of the skin and its annexa.	1. Ulcer, bedsore.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	1	1	3	1	..	..	M F	8 2	10
	2. Eczema.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	3. Pemphigus.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	4. Other diseases included under 154.		..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 1	2
X. Diseases of the Bones and Organs of Locomotion.																													
155. Diseases of the Bones,	1. Acute infective osteomyelitis and periostitis.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	M F	0 2	2
	2. Other diseases of the bones.		..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	M F	2 3	5
156. Diseases of the joints.			..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	M F	3 0	3
157. Amputation.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
158. Other diseases of the organs of locomotion.			..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XI. Congenital Malformations.																													
159. Congenital malformations,	1. Congenital hydrocephalus.		..	1	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	M F	1 4	5
	2. Congenital malformation of heart.		1	1	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	M F	2 3	5
	3. Other congenital malformations.		5	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	6 2	8
XII. Diseases of Early Infancy.																													
160. Congenital debility, sclerema and icterus,	1. Congenital debility and sclerema.		92	95	22	30	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	114 128	242
	2. Icterus neonatorum.		12	7	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	14 8	22
161. Premature birth, injury at birth.	1. Premature birth.		175	175	3	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	178 179	357
		Carried forward ..	935	798	856	674	573	492	137	141	70	46	184	77	487	148	1,221	424	1,247	326	1,083	288	650	301	1	1		.	

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

XII. Diseases of Early Infancy—*(contd.)*		Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward ..	935	798	856	674	573	492	137	141	70	46	184	77	487	148	1,221	424	1,247	326	1,083	288	650	301	1	1			
	2. Injury at birth.	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	3 0	3
162. Other diseases peculiar to early infancy,	1. Diseases of the umbilicus.	4	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	4 2	6
	2. Atelectasis.	29	16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	29 16	45
	3. Other diseases included under 162.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
163. Lack of care.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XIII. Old Age.																												
164. Old age,	1. Senile dementia.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other forms of senile decay.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	4	227	210	..	..	M F	232 214	446
XIV. External Causes.																												
165 & 166. Suicide by solid or liquid poisons and corrosive substances.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
167. Suicide by poisonous gas.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
168. Suicide by hanging or strangulation.		..	..	..	..	..	..	..	..	..	..	..	1	3	1	10	2	20	3	9	2	1	..	..	..	M F	43 9	52
169. Suicide by drowning.		..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
170. Suicide by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
171. Suicide by cutting or piercing instruments.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	1	..	..	..	M F	3 0	3
172. Suicide by jumping from high place.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
173. Suicide by crushing.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
174. Suicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
175. Food poisoning.		..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..	M F	2 1	3
	Carried forward ..	971	816	856	674	573	492	137	141	70	46	185	79	490	149	1,233	426	1,268	330	1,093	294	879	511	1	1			

XIV. External Causes—(*contd.*)	Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
Brought forward ..	971	816	856	674	573	492	137	141	70	46	185	79	490	149	1,233	426	1,268	330	1,098	294	879	511	1	1			
176. Poisoning by venomous animals.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
177. Other acute accidental poisoning (not by gas).	..	..	..	..	..	..	..	..	..	..	..	..	1	2	2	..	..	..	..	..	..	..	..	..	M F	3 2	5
178. Conflagration.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
179. Accidental burns (conflagration excepted).	..	..	2	..	..	1	1	..	..	..	..	1	4	..	2	..	..	..	..	..	1	..	..	..	M F	10 2	12
180. Accidental mechanical suffocation.	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	1 0	1
181. Accidental absorption of irrespirable or poisonous gas.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
182. Accidental drowning.	..	..	..	..	3	..	1	1	5	1	2	..	1	..	6	1	4	..	2	..	..	..	..	..	M F	24 3	27
183. Accidental injury by firearms.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
184. Accidental injury by cutting or piercing instruments.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
185. Accidental injury by fall.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
186. Accidental injury in mining and quarrying.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
187. Accidental injury by machinery.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
188. Accidental injury by other forms of crushing (road vehicles on railways, &c.)	..	..	..	..	..	..	1	1	1	..	..	..	1	..	2	..	..	2	3	..	1	2	1	..	M F	10 5	15
189. Injury by animals (poisoning by venomous animals excepted).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
190. Wounds of war.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
191. Execution of civilians by belligerent armies.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
192. Hunger or thirst.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
Carried forward ..	971	816	858	674	576	493	140	143	76	47	188	80	497	151	1,245	427	1,273	332	1,103	294	882	513	2	1			

MORTALITY IN RELATION TO AGE AND SEX FOR THE YEAR 1929.

XIV. External Causes—*(contd.)*			Under 3 Months		3 to 12 Months		1 to 5 Years		5 to 10 Years		10 to 15 Years		15 to 20 Years		20 to 25 Years		25 to 35 Years		35 to 45 Years		45 to 55 Years		Over 55		Unknown		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward ..	971	816	858	674	576	493	140	143	76	47	188	80	497	151	1,245	427	1,273	332	1,103	294	882	513	2	1			
193.	Excessive cold.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
194.	Excessive heat.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
195.	Lightning.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
196.	Electricity (Lightning expected).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	M F	2 0	2
197.	Homicide by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	2	..	3	..	4	..	2	..	1	..	..	..	M F	12 0	12
198.	Homicide by cutting or piercing instruments.		..	..	..	..	..	..	..	..	..	..	1	1	3	..	4	..	6	2	1	..	..	..	..	..	M F	15 3	18
199.	Homicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
200.	Infanticide (under one year).		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
201.	Fracture (cause not specified).		..	..	..	..	1	..	1	4	2	2	4	2	7	1	29	1	23	1	13	1	7	2	1	..	M F	88 14	102
202.	Other and unstated forms of accidental violence, Execution.		..	..	..	..	..	..	..	..	..	..	..	..	4	..	1	..	1	..	2	..	1	..	1	..	M F	10 0	10
203.	Violent deaths of unstated nature (i.e. accidental, suicidal &c.) and cause.		..	..	..	..	..	..	..	1	1	..	1	..	..	..	4	..	1	..	1	1	2	..	..	..	M F	10 2	12
XV. Ill Defined Diseases.																													
204.	Sudden death.		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
205.	Cause of death unstated or ill-defined.	1. Heart failure (age 1—70).	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	3	..	1	3	..	..	M F	5 5	10
		2. Other ill-defined causes.	26	25	38	49	48	58	12	4	2	3	10	8	17	8	61	17	56	15	51	19	42	13	1	..	M F	364 219	583
		3. Cause not specified.	2	1	1	3	1	3	..	..	1	..	..	1	1	..	3	..	8	..	1	..	..	..	14	1	M F	32 12	44
		Total ..	999	845	897	726	626	554	153	152	82	52	204	92	531	161	1,353	445	1,372	351	1,177	315	936	531	19	2	M F	8,349 4,226	12,575
			1,844		1,623		1,180		305		134		296		692		1,798		1,723		1,492		1,467		21				

The following return gives the number of deaths from each cause among males and females of the different nationalities. The classification followed is that of the International list (1926).

I. General Diseases.		Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F			
1. Enteric Fever.	1a. Typhoid Fever.	1	..	2	..	67	11	..	..	6	1	..	1	M F	76 13	89
	1b. Paratyphoid Fever.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
2. Typhus Fever.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
3. Relapsing Fever.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
4. Mediterranean Fever.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
5. Malaria.		2	..	3	1	768	189	26	20	57	11	2	1	M F	858 222	1,080
6. Small-pox.		1	..	..	..	1	..	..	..	..	..	..	..	M F	2 0	2
7. Measles.		..	1	..	..	1	1	..	..	..	..	..	..	M F	1 2	3
8. Scarlet Fever.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
9. Whooping Cough.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
10. Diphtheria.		..	..	..	2	6	10	..	..	1	1	..	1	M F	7 14	21
	Carried forward	4	1	5	3	844	212	26	20	64	13	2	3			

MORTALITY BY NATIONALITIES.

I. General Diseases—*(contd.)*			Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
		Brought forward	4	1	5	3	844	212	26	20	64	13	2	3			
11. Influenza.	11a. With pulmonary complications.	(1) With pneumonic complications.	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
		(2) With other pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	11b. Without pulmonary complications.	(1) With non-pulmonary complications.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Without stated complications.	..	..	..	..	29	17	10	18	8	3	..	1	M F	47 39	86
12. Miliary Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
13. Mumps.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
14. Asiatic Cholera.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
15. Cholera nostras.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
16. Dysentery.	16a. Amoebic.		..	1	..	..	73	9	1	2	14	3	1	1	M F	89 16	105
	16b. Bacillary.		..	..	..	..	49	6	..	..	11	2	..	..	M F	60 8	68
	16c. Other or Unspecified.		..	1	..	..	199	59	2	6	8	..	..	..	M F	209 66	275
		Carried forward	4	3	5	3	1195	303	39	46	105	21	3	5			

I. General Diseases—(*contd.*)			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	4	3	5	3	1195	303	39	46	105	21	3	5			
17. Plague.	17a. Bubonic.		..	..	..	..	2	..	..	..	1	..	..	..	M F	3 0	3
	17b. Pneumonic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17c. Septicaemic.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	17d. Not otherwise defined.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
18. Yellow Fever.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
19. Spirochaetosis ictero-haemorrhagica.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
20. Leprosy.			..	..	..	..	7	7	..	..	..	..	..	..	M F	7 7	14
21. Erysipelas.			..	..	..	..	4	..	..	..	1	..	..	..	M F	5 0	5
22. Acute Poliomyelitis.	(1) Acute poliomyelitis		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Acute polioencephalitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
23. Encephalitis lethargica.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
24. Meningococcal meningitis.			..	..	..	..	2	..	..	..	1	..	..	..	M F	3 0	3
		Carried forward	4	3	5	3	1211	310	39	46	108	21	3	5			

MORTALITY BY NATIONALITIES.

I. General Diseases—(*contd.*)			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	4	3	5	3	1211	310	39	46	108	21	3	5			
25. Other epidemic and endemic diseases.	(1) German Measles.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Varicella.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 25.		..	..	..	..	4	..	..	..	1	1	..	..	M F	5 1	6
26. Glanders.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
27. Anthrax.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
28. Rabies.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
29. Tetanus.			..	..	..	..	33	23	..	..	2	..	..	..	M F	35 23	58
30. Mycoses.	(1) Actinomycosis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other mycoses.		..	..	1	..	..	..	..	..	..	..	..	1	M F	1 1	2
31. Tuberculosis of the respiratory system.			2	2	8	6	912	230	52	38	69	28	24	5	M F	1,067 309	1,376
32. Tuberculosis of the central nervous system.			..	..	1	1	21	15	..	..	2	..	..	1	M F	24 17	41
33. Tuberculosis of intestines and peritoneum.			..	..	..	..	..	9	1	..	2	3	..	..	M F	3 12	15
		Carried forward	6	5	15	10	2181	587	92	84	184	53	27	12			

I. General Diseases—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	6	5	15	10	2181	587	92	84	184	53	27	12			
34. Tuberculosis of vertebral column.			..	..	..	..	2	..	..	..	..	..	..	..	M M	2 0	2
35. Tuberculosis of joints.			..	..	..	..	5	3	..	1	..	..	..	..	M F	5 4	9
36. Tuberculosis of other organs.	a. Skin and subcutaneous tissues.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Bones.		..	..	..	..	..	..	1	..	..	..	..	..	M F	1 0	1
	c. Lymphatic system.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	d. Genito-Urinary system.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	e. Other sites included under 36.		..	..	..	..	..	..	..	..	..	..	..	..	F F	0 0	0
37. Disseminated tuberculosis.	a. Acute.		..	..	..	..	5	4	..	..	..	..	..	..	M F	5 4	9
	b. Chronic or unstated.		..	..	..	..	26	11	2	2	2	..	..	1	M F	30 14	44
38. Syphilis.			..	..	..	..	81	31	4	2	3	3	1	1	M F	89 37	126
39. Soft chancre.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
40. Gonococcal Infection.	(1) Gonococcal infection except ophthalmia.		..	..	..	..	2	..	..	1	..	..	..	..	M F	2 1	3
		Carried forward	6	5	15	10	2305	636	99	90	189	56	28	14			

MORTALITY BY NATIONALITIES.

I. General Diseases—(*contd.*)			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	6	5	15	10	2305	636	99	90	189	56	28	14			
	(2) Gonorrhoeal or purulent ophthalmia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
41. Purulent infection, Septicamia.			1	..	1	..	62	28	1	1	8	1	..	..	M F	73 30	103
42. Other infectious diseases.	(1) Vaccinia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases included under 42.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
II. General Diseases not included above.																	
43. Cancer of the buccal cavity.			1	..	..	1	3	4	..	1	..	..	..	..	M F	4 6	10
44. Cancer of the pharynx, etc.			1	1	..	..	80	12	6	4	2	..	..	1	M F	89 18	107
45. Cancer of the peritoneum, intestines and rectum.			..	1	..	..	3	1	1	..	..	..	..	..	M F	4 2	6
46. Cancer of the female genital organs.			..	..	..	1	..	19	..	..	..	..	..	..	M F	0 20	20
47. Cancer of the breast.			..	1	..	1	..	4	..	3	..	1	..	..	M F	0 10	10
48. Cancer of the skin.			..	1	..	..	2	1	..	1	..	..	..	..	M F	2 3	5
		Carried forward	9	9	16	13	2455	705	107	100	199	58	28	15			

II. General Diseases not included above—*(contd.)*				Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
				M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward	9	9	16	13	2455	705	107	100	199	58	28	15			
49.	Cancer of other or unspecified organs.			..	..	..	..	24	6	..	..	4	..	2	1	M F	30 7	37
50.	Tumours not returned as malignant.			..	..	..	..	2	1	..	..	..	..	..	...	M F	2 1	3
51.	Rheumatic Fever.			..	..	..	..	3	1	..	..	1	..	..	..	M F	4 1	5
52.	Chronic rheumatism, Osteo-arthritis, Gout.	(1) Chronic rheumatism chronic arthritis.		..	..	..	..	7	3	1	2	..	..	..	..	M F	8 5	13
		(2) Rheumatoid arthritis.		..	..	..	..	1	1	1	..	..	..	..	..	M F	2 1	3
		(3) Gout.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
53.	Scurvy.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
54.	Pellagra.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
55.	Beri-beri.			..	..	..	..	535	122	18	15	7	1	1	2	M F	561 140	701
56.	Rickets			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
57.	Diabetes.			1	..	2	..	8	10	..	1	3	..	..	1	M F	14 12	26
58.	Anaemia, Chlorosis.	a. Pernicious anaemia.		..	..	..	..	4	3	..	1	..	1	..	..	M F	4 5	9
			Carried forward	10	9	18	13	3039	853	127	119	214	60	31	19			

MORTALITY BY NATIONALITIES.

II. General Diseases not included above—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	9	18	13	3039	853	127	119	214	60	31	19			
	b. Other anaemia and chlorosis.		..	..	..	1	5	3	..	..	6	3	..	..	M F	11 7	18
59. Diseases of the pituitary gland.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
60. Diseases of the thyroid gland.	a. Exophthalmic goitre.		..	..	..	..	1	2	..	..	..	..	..	..	M F	1 2	3
	b. Other diseases of the thyroid gland	(1) Myxoedema.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(2) Cretinism.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		(3) Other diseases included under 60b.	..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
61. Diseases of the parathyroid glands.	(1) Tetany.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Other diseases of the parathyroid glands.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
62. Diseases of the thymus.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
63. Diseases of the adrenals.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
64. Diseases of the spleen.			..	..	..	..	9	..	..	..	1	..	..	..	M F	10 0	10
65. Leukaemia, Lyphadenoma.	a. Leukaemia		..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
		Carried forward	10	9	18	14	3056	858	128	119	221	63	31	19			

II. General Diseases not included above—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	9	18	14	3056	858	128	119	221	63	31	19			
	b. Lymphadenoma.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
66. Alcoholism.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
67. Chronic poisoning by mineral substances.	(1) Occupational lead poisoning.		..	..	..	..	..	..	..	..	..	..	..	.	M F	0 0	0
	(2) Other chronic poisoning by mineral substances.		..	..	1	..	..	..	..	..	..	..	..	..	M F	1 0	1
68. Chronic poisoning by organic substances.			..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
69. Other general diseases.	(1) Purpura.		..	..	..	..	3	..	..	..	..	..	..	..	M F	3 0	3
	(2) Haemophilia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(3) Other diseases included under 69.		..	..	..	..	9	7	4	..	1	1	..	..	M F	14 8	22
III. Diseases of the Nervous System and Sense Organs.																	
70. Encephalitis.	(1) Cerebral abscess.		..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
	(2) Other diseases included under 70.		..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
71. Meningitis.			..	..	..	1	22	4	..	1	5	..	1	..	M F	28 6	31
		Carried forward	10	9	19	15	3095	870	132	120	228	64	32	19			

MORTALITY BY NATIONALITIES.

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	9	19	15	3095	870	132	120	228	64	32	19			
72. Tabes dorsalis.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
73. Other diseases of the spinal cord.			..	..	..	..	3	1	..	..	..	..	..	..	M F	3 1	4
74. Cerebral haemorrhage, Apoplexy, etc.	a. Cerebral haemorrhage.	(1) Cerebral haemorrhage so returned.	..	..	3	..	44	26	2	1	5	1	2	1	M F	56 29	85
		(2) Apoplexy lesion unstated).	..	..	..	..	16	11	..	..	3	..	..	..	M F	19 11	30
	b. Cerebral thrombosis and embolism.	(1) Cerebral embolism.	..	..	..	..	..	1	..	..	1	..	..	1	M F	1 2	3
		(2) Cerebral thrombosis.	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
75. Paralysis of unstated origin.	a. Hemiplegia.		..	..	..	1	4	..	..	2	1	..	1	..	M F	6 3	9
	b. Other forms of paralysis.		..	..	..	..	12	6	..	..	1	..	..	..	M F	13 6	19
76. General paralysis of the insane.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
77. Other forms of insanity.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
78. Epilepsy.			..	..	..	..	..	3	..	..	..	..	..	..	M F	0 3	3
		Carried forward	10	9	22	16	3177	918	134	123	239	65	35	21			

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	9	22	16	3177	918	134	123	239	65	35	21			
79. Convulsions (non peurperal 5 years and over).			..	..	..	..	3	6	1	1	..	1	..	..	M F	4 8	12
80. Infantile convulsions (under 5 years of age).			..	..	2	4	526	410	144	119	22	18	1	2	M F	695 553	1,248
81. Chorea.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
82. Hysteria and neuritis.	(1) Hysteria, Neuralgia.		..	1	..	..	..	..	..	..	..	..	..	..	M F	0 1	1
	(2) Neuritis.		..	..	..	..	5	9	6	8	..	3	..	..	M F	11 20	31
83. Cerebral softening.			..	..	..	..	1	..	..	..	1	..	..	..	M F	2 0	2
84. Other diseases of the nervous system.	(1) Idiocy, Imbecility.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(2) Cerebral tumour.		..	..	..	..	3	1	..	..	1	..	..	..	M F	4 1	5
	(3) Disseminated sclerosis.		..	..	..	..	..	..	..	1	..	..	..	..	M F	0 1	1
	(4) Paralysis agitans.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	(5) Other diseases included under 84.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
		Carried forward	10	10	24	20	3716	1346	285	252	263	87	36	23			

MORTALITY BY NATIONALITIES.

III. Diseases of the Nervous System and Sense Organs—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	10	10	24	20	3716	1346	285	252	263	87	36	23			
85.	Diseases of the eye and annexa.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
86.	Diseases of the ear and mastoid sinus.	(1) Diseases of the mastoid sinus.	..	..	..	..	..	2	..	..	1	..	..	..	M F	1 2	3
		(2) Diseases of the ear.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
IV. Diseases of the Circulatory System.																	
87.	Pericarditis.		..	..	..	..	3	1	..	..	1	2	..	..	M F	4 3	7
88.	Acute endocarditis and myocarditis.	(1) Malignant endocarditis.	1	..	..	..	6	1	..	..	..	..	..	..	M F	7 1	8
		(2) Other acute endocarditis.	..	..	..	..	16	3	1	..	2	..	..	..	M F	19 3	22
		(3) Acute myocarditis.	1	..	..	..	30	8	2	..	3	..	..	..	M F	36 8	44
89.	Angina pectoris.		1	..	..	..	..	..	..	..	2	..	..	..	M F	3 0	3
90.	Other diseases of the heart.	(1) Aortic valve disease.	..	..	1	1	51	26	2	..	7	..	1	1	M F	62 28	90
		(2) Mitral valve disease.	..	..	..	..	4	6	..	..	1	..	..	..	M F	5 6	11
		(3) Aortic and mitral valve disease.	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
		Carried forward	13	10	25	21	3828	1394	290	252	280	89	37	24			

IV. Diseases of the Circulatory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	13	10	25	21	3828	1394	290	252	280	89	37	24			
	(4) Other or unspecified valve disease.		..	..	..	..	4	1	..	..	..	1	1	..	M F	5 2	7
	(5) Fatty heart.		1	..	..	..	1	1	..	..	..	..	..	..	M F	2 1	3
	(6) Dilatation of heart (cause unspecified)		1	1	..	..	4	1	..	..	1	..	..	..	M F	6 2	8
	(7) Other or unspecified myocardial disease		..	1	..	..	17	8	1	..	7	1	..	..	M F	25 10	35
	(8) Disordered action of heart.		1	..	..	..	1	..	..	1	..	..	..	..	M F	2 1	3
	(9) Heart disease (undefined)		..	..	..	..	5	2	1	..	..	1	..	..	M F	6 3	9
91. Diseases of the Arteries.	a. Aneurysm.		..	..	..	..	5	..	..	..	..	..	..	..	M F	5 0	5
	b. Arterio-sclerosis.	(1) Arterio sclerosis with record of cerebral vascular lesion.	1	..	..	..	8	8	1	..	2	1	..	..	M F	12 9	21
		(2) Arterio sclerosis without record of cerebral vascular lesion.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Other diseases of the arteries.		..	..	..	..	7	1	..	..	1	..	1	..	M F	9 1	10
		Carried forward	17	12	25	21	3880	1416	293	253	291	93	39	24			

MORTALITY BY NATIONALITIES.

IV. Diseases of the Circulatory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	17	12	25	21	3880	1416	293	253	291	93	39	24			
92. Embolism and thrombosis (not cerbral).			..	1	..	..	1	11	..	1	..	1	..	..	M F	1 14	15
93. Diseases of the veins (Varix, haemorrhoids, phlebitis, etc.)			..	..	..	1	..	..	..	..	..	..	..	..	M F	0 1	1
94. Diseases of the lymphatic system.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
95. Haemorrhage without stated cause.			..	..	..	..	6	1	..	..	1	1	..	..	M F	7 2	9
96. Other diseases of the circulatory system.			..	..	..	..	1	..	1	..	..	..	..	..	M F	2 0	2
V. Diseases of the Respiratory System.																	
97. Diseases of the nasal fossae and annexa.	(1) Diseases of the nose		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Diseases of the accessory nasal sinuses.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
98. Diseases of the Larynx.	(1) Laryngismus stridulus.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Laryngitis.		..	..	..	1	1	..	..	..	..	1	..	..	M F	1 2	3
	(3) Other diseases of the larynx.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	17	13	25	23	3889	1428	294	254	292	96	39	24			

V. Diseases of the Respiratory System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	17	13	25	23	3889	1428	294	254	292	96	39	24			
99. Bronchitis.	a. Acute bronchitis.		..	..	..	..	9	8	..	3	..	..	..	..	M F	9 11	20
	b. Chronic bronchitis.		..	..	..	..	7	8	..	1	..	..	..	..	M F	7 9	16
	c. & d. Bronchitis not distinguished as acute or chronic.		..	..	2	..	108	75	17	14	3	8	..	..	M F	130 97	227
100. Broncho-pneumonia.			..	..	12	5	470	300	44	28	38	21	2	4	M F	566 358	924
101. Pneumonia, lobar, or not otherwise defined.	a. Lobar pneumonia.		1	..	2	..	232	54	24	16	102	13	2	..	M F	363 83	446
	b. Pneumonia not otherwise defined.		..	..	1	1	233	87	19	15	26	14	3	1	M F	282 118	400
102. Pleurisy.	1. Empyema.		..	..	..	..	7	2	..	..	..	..	..	..	M F	7 2	9
	2. Other pleurisy.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
103. Congestion and haemorrhage infarct of lung.			1	..	..	..	3	..	..	2	3	..	..	..	M F	7 2	9
104. Gangrene of the lung.			..	..	..	..	4	..	1	..	3	..	..	..	M F	8 0	8
105. Asthma.			1	..	1	..	16	11	1	..	3	2	..	..	M F	22 13	35
106. Pulmonary emphysema.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	20	13	43	29	4979	1974	400	333	470	154	46	29			

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			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
V. Diseases of the Respiratory System—*(contd.)*			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	20	13	43	29	4979	1974	400	333	470	154	46	29			
107. Other diseases of the respiratory system.	a. Chronic interstitial pneumonia including occupational diseases of the lung		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
	b. Diseases of the mediastinum.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
	c. Other diseases included under 107		..	..	..	..	6	1	..	..	..	..	..	..	M F	6 1	7
VI. Diseases of the Digestive System.																	
108. Diseases of the buccal cavity and annexa.	(1) Diseases of the teeth and gums.		1	..	..	..	1	1	..	..	..	..	..	..	M F	2 1	3
	(2) Ludwigs angina.		..	..	..	..	3	1	..	..	1	1	..	..	M F	4 2	6
	(3) Other diseases included under 108.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
109. Diseases of the pharynx and tonsils.	(1) Tonsillitis, Adenoid Vegetations.		..	..	..	1	..	2	..	..	1	..	..	..	M F	1 3	4
	(2) Other diseases included under 109.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
110. Diseases of the oesophagus.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
111. Ulcer of the stomach or duodenum.	a. Ulcer of the stomach.		1	..	..	1	21	7	..	..	1	..	2	..	M F	25 8	33
		Carried forward	22	13	43	31	5012	1987	400	333	473	155	48	29			

VI. Diseases of the Digestive System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	22	13	43	31	5012	1987	400	333	473	155	48	29			
	b. Ulcer of the duodenum.		..	..	..	..	5	1	..	..	..	..	..	..	M F	5 1	6
112. Other diseases of the stomach.	1. Inflammation of the stomach.		..	..	..	2	53	35	25	24	4	6	1	..	M F	83 67	150
	2. Other diseases included under 112.		..	..	..	..	1	4	..	1	..	..	..	..	M F	1 5	6
113. & 114. Diarrhoea and enteritis.	(1) Ulceration of the intestines.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	(2) Colitis.		..	..	..	1	23	15	1	2	1	..	..	..	M F	25 18	43
	(3) Other diseases included under 113 and 114.		..	..	1	..	401	297	24	24	15	14	3	8	M F	444 343	787
115. Ankylostomiasis.			..	..	..	..	4	12	..	1	4	10	..	..	M F	8 23	31
116. Diseases due to other intestinal parasites.	a. Cestodes, (hydatids of liver excepted).		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Trematodes.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	c. Nematodes other than Ankylostoma.		..	..	..	..	2	4	1	1	1	1	..	..	M F	4 6	10
	d. Coccidia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	e. Other specified parasites in 116.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	22	13	44	34	5501	2355	451	386	498	186	52	37			

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VI. Diseases of the Digestive System—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	22	13	44	34	5501	2355	451	386	498	186	52	37			
	f. Undefined intestinal parasites.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
117. Appendicitis.			1	..	1	..	9	..	..	..	3	..	..	..	M F	14 0	14
118. Hernia, Intestinal obstruction.	a. Hernia.		..	..	..	..	12	..	2	..	3	..	..	..	M F	17 0	17
	b. Intestinal obstruction.		..	..	2	..	4	1	1	..	2	..	2	..	M F	11 1	12
119. Other diseases of the intestines.	1. Intestinal stasis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other diseases included under 119.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
120. Acute yellow atrophy of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
121. Hydatid tumour of the liver.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
122. Cirrhosis of the liver.	(1) Returned as alcoholic.		..	..	..	..	6	1	1	..	..	..	..	..	M F	7 1	8
	(2) Not returned as alcoholic		..	..	..	..	55	8	3	2	3	..	..	..	M F	61 10	71
123. Biliary Calculi.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
124. Other diseases of the liver.			..	..	..	..	32	4	..	..	3	..	1	..	M F	36 4	40
		Carried forward	23	13	47	34	5620	2371	458	388	512	186	55	37			

VI. Diseases of the Digestive System—*(contd.)*			Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
		Brought forward	23	13	47	34	5620	2371	458	388	512	186	55	37			
125. Diseases of the pancreas.			..	..	..	..	1	1	..	..	1	..	..	..	M F	2 1	3
126. Peritonitis without stated cause.			..	..	..	..	22	6	1	..	1	..	1	1	M F	25 7	32
127. Other diseases of the digestive system.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa.																	
128. Acute nephritis. (including unspecified under 10 years of age).			..	..	..	..	41	27	2	1	2	..	..	..	M F	45 28	73
129. Chronic nephritis. (including unspecified over 10 years of age).			4	1	1	4	232	171	21	15	20	6	4	..	M F	282 197	479
130. Chyluria.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
131. Other diseases of the kidney and annexa.			..	..	1	..	8	4	1	..	2	..	..	..	M F	12 4	16
132. Calculi of the urinary passages.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
133. Diseases of the bladder.	1. Cystitis.		..	..	..	..	7	..	2	..	..	..	..	..	M F	9 0	9
		Carried forward	27	14	49	38	5931	2580	485	404	538	192	60	38			

MORTALITY BY NATIONALITIES.

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*				Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
				M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward	27	14	49	38	5931	2580	485	404	538	192	60	38			
		2. Other diseases of the bladder.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
134.	Diseases of the urethra, urinary abscess, etc.	a. Stricture of the urethra, etc.,		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		b. Other diseases of the urethra.		..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
135.	Diseases of the prostate.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
136.	Non-venereal diseases of the male genital organs.			..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
137.	Cysts, and other tumours of the ovary not returned as malignant.			..	..	..	..	..	5	..	..	..	..	..	..	M F	0 5	5
138.	Salpingitis and pelvic abscess in females.	1. Salpingitis.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		2. Pelvic abscess in females.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
139.	Tumours of the uterus not returned as malignant.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
140.	Non-puerperal uterine-haemorrhage.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
			Carried forward	27	14	49	38	5934	2585	485	404	539	192	60	38			

VII. Non-Venereal Diseases of the Genito-Urinary System and Annexa—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	27	14	49	38	5934	2585	485	404	539	192	60	38			
141. Other diseases of the female genital organs.	1. Other diseases of the uterus.		..	..	..	..	..	1	..	..	..	..	..	1	M F	0 2	2
	2. Diseases of the female genital organs not included under other headings.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
142. Non-puerperal diseases of the breast			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
VIII. The Puerperal State.																	
143. Accidents of pregnancy.	a. Abortion.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	b. Ectopic gestation.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	
	c. Other accidents of pregnancy.		..	..	..	..	..	3	..	..	..	1	..	..	M F	0 4	4
144. Puerperal Haemorrhage.			..	..	..	..	..	13	..	2	..	1	..	..	M F	0 16	16
145. Other accidents of childbirth.			..	..	..	..	..	22	..	8	..	3	..	..	M F	0 33	33
146. Puerperal sepsis.			..	..	..	..	..	15	..	2	..	1	..	..	M F	0 18	18
147. Puerperal phlegmasia alba dolens, embolism and sudden death.	1. Puerperal phlegmasia alba dolens not returned as septic.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1 0
		Carried forward	27	14	49	38	5934	2641	485	416	539	198	60	39			

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VIII. The Puerperal State.—(*contd.*)				Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
				M	F	M	F	M	F	M	F	M	F	M	F			
			Brought forward	27	14	49	38	5934	2641	485	416	539	198	60	39			
		2. Puerperal embolism and sudden death.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
148.	Puerperal albuminuria and convulsions.			..	..	..	..	..	13	..	3	..	..	..	..	M F	0 16	16
149.	Childbirth not assignable to other headings (puerperal insanity).			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
150.	Puerperal diseases of the breast.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	IX. Diseases of the Skin and Cellular Tissue.																	
151.	Gangrene	1. Senile gangrene. (aged 60 and over).		..	..	..	..	..	2	..	..	..	..	..	..	M F	0 2	2
		2. Other gangrene.		..	..	..	..	9	6	..	..	1	..	..	..	M F	10 6	16
152.	Carbuncle, boil.			..	..	..	..	4	7	..	..	..	..	..	..	M F	4 7	11
153.	Cellulitis, acute abscess.	1. Cellulitis.		..	..	..	..	5	4	2	..	..	1	..	1	M F	7 6	13
		2. Acute abscess.		..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
154.	Other diseases of the skin and its annexa.	1. Ulcer, bedsore.		..	..	..	..	8	1	..	1	..	..	..	..	M F	8 2	10
			Carried forward	27	14	49	38	5960	2675	487	420	540	199	60	40			

IX. Diseases of the Skin and Cellular Tissue—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	27	14	49	38	5960	2675	487	420	540	199	60	40			
	2. Eczema.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	3. Pemphigus.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	4. Other diseases included under 154.		..	..	..	..	1	1	..	..	..	..	..	..	M F	1 1	2
X. Diseases of the Bones and Organs of Locomotion.																	
155. Diseases of the Bones.	1. Acute infective osteomyelitis and periostitis.		..	..	..	1	..	..	..	..	..	1	..	..	M F	0 2	2
	2. Other diseases of the bones.		..	..	..	..	2	2	..	1	..	..	..	..	M F	2 3	5
156. Diseases of the joints.			..	..	..	..	2	..	..	..	..	..	1	..	M F	3 0	3
157. Amputation.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
158. Other diseases of the organs of locomotion.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
XI. Congenital Malformations.																	
159. Congenital malformations.	1. Congenital hydrocephalus.		..	..	..	..	1	4	..	..	..	..	..	..	M F	1 4	5
		Carried forward	27	14	49	39	5966	2682	487	421	540	200	61	40			

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XI. Congenital Malformations—(*contd.*)			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	27	14	49	39	5966	2682	487	421	540	200	61	40			
	2. Congenital malformation of heart.		..	..	..	..	2	3	..	..	..	..	..	..	M F	2 3	5
	3. Other congenital malformations.		..	..	..	..	5	2	..	..	1	..	..	..	M F	6 2	8
XII. Disease of Early Infancy.																	
160. Congenital debility sclerema and icterus.	1. Congenital debility and sclerema.		1	1	..	..	74	82	26	32	13	13	..	..	M F	114 128	242
	2. Icterus neonatorum.		..	..	..	..	13	5	1	3	..	..	..	..	M F	14 8	22
161. Premature birth, injury at birth.	1. Premature birth.		3	..	..	2	141	153	19	16	13	8	2	..	M F	178 179	357
	2. Injury at birth.		..	..	..	..	3	..	..	..	..	..	..	..	M F	3 0	3
162. Other diseases peculiar to early infancy.	1. Diseases of the umbilicus.		..	..	..	..	4	2	..	..	..	..	..	..	M F	4 2	6
	2. Atelectasis.		..	..	..	1	24	14	2	..	3	1	..	..	M F	29 16	45
	3. Other diseases included under 162.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
163. Lack of care.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	31	15	49	42	6232	2943	535	472	570	222	63	40			

XIII. Old Age.			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	31	15	49	42	6232	2943	535	472	570	222	63	40			
164. Old age.	1. Senile dementia.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	2. Other forms of senile decay.		2	1	1	1	167	155	42	37	18	19	2	1	M F	232 214	446
XIV. External Causes.																	
165. & 166. Suicide by solid or liquid poisons and corrosive substances.			..	..	..	..	..	1	..	..	..	..	..	..	M F	0 1	1
167. Suicide by poisonous gas.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
168. Suicide by hanging or strangulation.			..	..	..	..	41	8	..	1	2	..	..	..	M F	43 9	52
169. Suicide by drowning.			..	..	..	..	1	..	..	..	..	..	..	..	M F	1 0	1
170. Suicide by firearms.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
171. Suicide by cutting or piercing instruments.			..	..	..	..	3	..	..	..	..	..	..	..	M F	3 0	3
172. Suicide by jumping from high place.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
173. Suicide by crushing.			..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
		Carried forward	33	16	50	43	6444	3107	577	510	590	241	65	41			

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XIV. External Causes—*(contd.)*		Europeans M	Europeans F	Eurasians M	Eurasians F	Chinese M	Chinese F	Malays M	Malays F	Indians M	Indians F	Others M	Others F	Sex	Totals	
	Brought forward	33	16	50	43	6444	3107	577	510	590	241	65	41			
174. Suicide by other means.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
175. Food poisoning.		..	..	..	..	2	1	..	..	..	..	..	..	M F	2 1	3
176. Poisoning by venomous animals.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
177. Other acute accidental poisoning (not by gas).		..	..	..	1	..	1	1	..	2	..	..	..	M F	3 2	5
178. Conflagration.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
179. Accidental burns (conflagration excepted)		..	..	..	..	9	1	..	1	1	..	..	..	M F	10 2	12
180. Accidental mechanical suffocation.		..	..	..	..	..	..	..	..	1	..	..	..	M F	1 0	1
181. Accidental absorption of irrespirable or poisonous gas.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
182. Accidental drowning.		..	..	..	..	22	3	1	..	..	..	1	..	M F	24 3	27
183. Accidental injury by firearms.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
184. Accidental injury by cutting or piercing instruments.		..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
	Carried forward	33	16	50	44	6477	3113	579	511	594	241	66	41			

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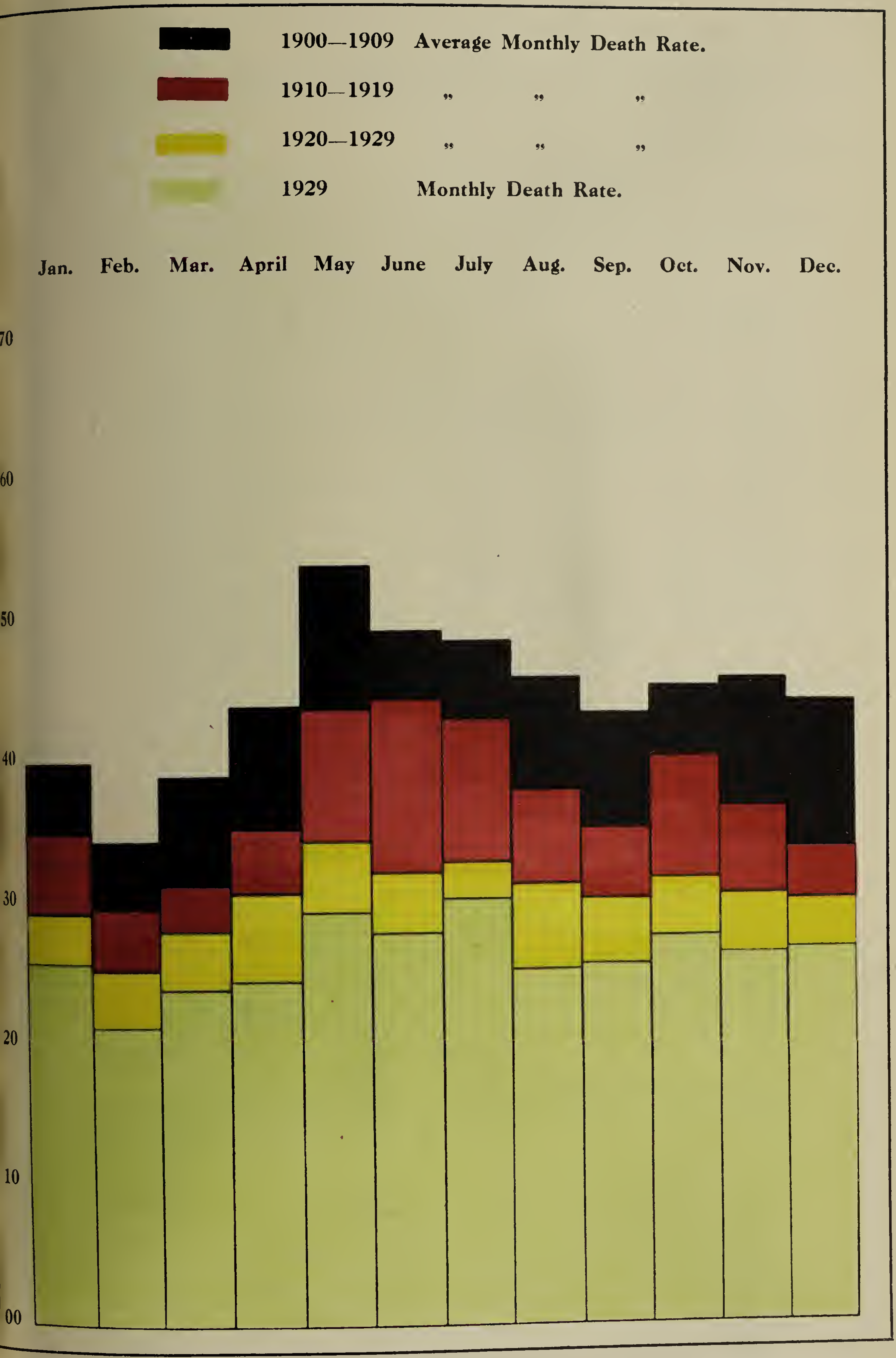
XIV. External Causes—(*contd.*)		Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
		M	F	M	F	M	F	M	F	M	F	M	F			
	Brought forward	33	16	50	44	6477	3113	579	511	594	241	66	41			
185. Accidental injury by fall.		..	..	..	..	1	..	..	..	..	..	..	..	M	1	1
														F	0	
186. Accidental injury in mining & quarrying.		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
187. Accidental injury by machinery.		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
188. Accidental injury by other forms of crushing (road vehicles on railways, &c.)		1	..	..	..	9	4	..	1	..	..	..	..	M	10	15
														F	5	
189. Injury by animals (poisoning by venomous animals excepted).		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
190. Wounds of war.		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
191. Execution of civilians by belligerent armies.		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
192. Hunger or thirst.		..	..	..	..	1	..	..	..	..	..	..	..	M	1	1
														F	0	
193. Excessive cold.		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
194. Excessive heat.		..	..	..	..	..	..	..	..	..	..	..	..	M	0	0
														F	0	
	Carried forward	34	16	50	44	6488	3117	579	512	594	241	66	41			

MORTALITY BY NATIONALITIES.

XIV. External Causes—*(contd.)*	Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
	M	F	M	F	M	F	M	F	M	F	M	F			
Brought forward	34	16	50	44	6488	3117	579	512	594	241	66	41			
195. Lightning.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
196. Electricity (Lightning expected).	..	..	..	..	2	..	..	..	..	..	..	..	M F	2 0	2
197. Homicide by firearms.	..	..	..	..	11	..	..	..	1	..	..	..	M F	12 0	12
198. Homicide by cutting or piercing instruments.	1	..	..	..	10	3	..	..	4	..	..	..	M F	15 3	18
199. Homicide by other means.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
200. Infanticide (under one year).	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
201. Fracture (cause not specified).	..	..	..	..	69	8	6	3	12	3	1	..	M F	88 14	102
202. Other and unstated forms of accidental violence, Execution.	..	..	..	..	5	..	..	..	3	..	2	..	M F	10 0	10
203. Violent deaths of unstated nature (i.e. accidental, suicidal &c.) and cause.	..	..	..	..	6	2	3	..	1	..	..	..	M F	10 2	12
XV. Ill Defined Diseases.															
204. Sudden death.	..	..	..	..	..	..	..	..	..	..	..	..	M F	0 0	0
Carried forward	35	16	50	44	6591	3130	588	515	615	244	69	41			

MORTALITY BY NATIONALITIES.

XV. Ill Defined Diseases—*(contd.)*			Europeans		Eurasians		Chinese		Malays		Indians		Others		Sex	Totals	
			M	F	M	F	M	F	M	F	M	F	M	F			
		Brought forward	35	16	50	44	6591	3130	588	515	615	244	69	41			
205. Cause of death unstated or ill-defined.	1. Heart failure (age 1—70).		..	..	..	..	4	3	1	2	..	..	..	..	M F	5 5	10
	2. Other ill-defined causes.		..	..	1	2	314	186	32	24	15	7	2	..	M F	364 219	583
	3. Cause not specified.		..	..	..	..	16	8	1	..	3	1	12	3	M F	32 12	44
			35	16	51	46	6925	3327	622	541	633	252	83	44	M F	8,349 4,226	12,575
			51		97		10,202		1,163		885		127				


1900—1909 Average Monthly Death Rate.
1910—1919 „ „ „
1920—1929 „ „ „
1929 Monthly Death Rate.
Jan.
Feb.
Mar.
April
May
June
July
Aug.
Sep.
Oct.
Nov.
Dec.
70
60
50
40
30
20
10
00

MORTALITY ACCORDING TO NATIONALITIES AND AGES.

The following return shows the number of deaths at different age periods in the different nationalities:—

	Sex	Under 3 months	3-12 months	1—5 years	5—10 years	10—20 years	20—25 years	25—35 years	35—45 years	45—55 years	Over 55 years	Unknown	TOTAL	
Europeans ..	M	2	2	1	—	2	3	6	3	10	5	1	35	51
	F	—	2	1	—	—	1	1	4	3	3	1	16	
Eurasians ..	M	5	6	10	—	4	1	2	5	9	9	—	51	97
	F	7	9	4	2	2	5	5	1	—	11	—	46	
Chinese ..	M	808	719	509	137	225	442	1,116	1,199	1,004	760	6	6,925	10,252
	F	659	565	455	132	103	115	343	294	246	414	1	3,327	
Malays ..	M	125	137	60	9	14	13	70	54	52	88	—	622	1,163
	F	133	113	52	10	22	17	45	32	48	69	—	541	
Indians ..	M	53	28	38	7	38	70	151	101	85	60	2	633	885
	F	39	29	36	8	13	20	46	17	15	29	—	252	
Others ..	M	6	5	8	—	3	2	8	10	17	14	10	83	127
	F	7	8	6	—	4	3	5	3	3	5	—	44	
Total ..	M	999	897	626	153	286	531	1,353	1,372	1,177	936	19	8,349	12,575
	F	845	726	554	152	144	161	445	351	315	531	2	4,226	
GRAND TOTAL	..	1,844	1,623	1,180	305	430	692	1,798	1,723	1,492	1,467	21		

GENERAL DEATH RATE.

The crude death rate was, as stated, 26.21 per 1,000 as against 28.44 for 1928. It is the lowest yet recorded and is well below the average of 31.05 for the previous decade.

In Chart I. I have endeavoured to show the progressive fall in the death rate for the past three decades commencing with the year 1900 and ending with and including the year under review. It will be seen that in addittion there has been a steady fall in the average monthly death rates. The monthly death rate for 1929 is also shown in the chart for comparison.

Discounting the deaths of those who, at death, had been resident less than three months we have a corrected death rate of 24.91. The corresponding figure for 1928 was 26.96.

As I explained in my 1928 Report it is almost impossible with the imperfect records that are kept of the movements of individuals, to make any other correction than the one shown above, though it is well known that many of the deaths especially in hospital, are " external " deaths. Last year I analysed the admissions for Malaria reported from the third class wards of the General Hospital and from the wards of Tan Tock Seng pauper hospital. These were analysed from the point of view of the likely source of infection and the figures so obtained I used to surmise how the recorded deaths from the same cause might be apportioned to their real place of origin. The same records were carefully kept throughout the year and have been tabulated in a similar manner. They are extremely interesting and are worth recording, as I feel they give at least an approximation to the truth.

I have used the same five classifications as in the 1928 report, these being based on the addresses given, and our knowledge of what mosquito breeding was taking place in the vicinity.

A total of 4,024 admissions was reported, 1,055 from the General Hospital and 2,969 from Tan Tock Seng. These were classified as follows:—

Probable Singapore Infections	187
Possible Singapore Infections	370
Impossible Singapore Infections	1,366
Outside Municipal Limits	1,817
Insufficient Addresses	284
	4,024

The "Outside Limits" figure alone is 45% of the total. Incidentally of the total of 1,817 under this heading Johore supplied 801, the Rural Board Area 664, and the Dutch Islands 196.

The "Impossible" and "Outside Limits" figures taken together total 3,183 or 79%. The "Probable" figure is only 4.6% while the "Probable" and "Possible" figures taken together give 13.8%.

So far as the "Impossible" areas are concerned, from our knowledge of these I do not think we are wrong in discounting practically every case. Even with the "Probable" and "Possible" areas, there is a doubt in my mind as to whether all the cases giving addresses in these areas contracted their Malaria there. At any rate toward the end of the year through the courtesy of the P.C.M.O. a spleen index was taken of the children in three schools in the Geylang district, most of whose homes are in areas labelled "Probable" and "Possible." I must say the result was surprising. It was nil. It is a fair conclusion to draw, I think, that the Malarial incidence of these areas cannot be high, if the children show no signs of the disease.

Turning now to the recorded deaths from Malaria, there were 1,080 of these for the year. Applying the figures obtained above the 79% figure would place 853 of the deaths as "external." And in the light of other evidence even more might be so classed. But even if only the 853 are so relegated, it is sufficient to drop the crude death rate to 24.4.

Of the chief causes of death the Pneumonias with 1,770, and Tuberculosis with 1,500 (Phthisis 1,376) again head the list. The two together caused 26% of the total deaths slightly more than last year, so that there is no improvement to record. I quote one figure from the work of the Infant Welfare branch of the department, which is of interest from the point of view of the continued high prevalence of these two diseases. During the year the District nurses visited 11,514 mothers following childbirth. They report that of these 8,552, or approximately 75%, were living in cubicles or single rooms. This figure may be taken as a reliable index of the close herding of the general mass of our population. It is altering but slowly for the better but until there is a radical improvement I am afraid we must expect a continued high mortality from the diseases in question.

Convulsions accounted for 1,248 deaths, all of them under 5 years of age, and 1,073 of them in infants. The term "Convulsion" covers, I am sure, a multitude of maldiagnoses but it is unavoidable at the moment. I would refer my readers however to my remarks under Diphtheria, from which they can draw their own conclusions.

Diarrhoea and Enteritis accounted for 830 deaths, 607 of them in infants. Much of this mortality is, I am confident, unnecessary, being due to errors in diet and ignorance of the mothers generally. The only way to combat this is by intensifying the work of the Infant Welfare visitors whose duties are, and should remain for some time to come, mostly educative.

Beri beri is reported to have caused 701 deaths. The more I study this disease the more difficult I find it to accept these figures as correct, if by Beri beri a purely deficiency disease is understood. The race and age distribution are rather against a purely deficiency disease for it occurs mostly in adult Chinese of working age. They, of all the Asiatic races, when they have money to spend, are inclined to spend it on adjuncts to their ordinary dietary. And again why should we have one diet deficiency disease so prevalent when Rickets, another deficiency disease, is comparatively rare, and that too in the face of conditions of feeding and dietary that must inevitably result in the production of Rickets in a temperate climate?

INFANTILE DEATH RATE.

The infantile death rate was 197.5 per 1,000 as against 202.1 for 1928 and an average of 229.3 for the past ten years. Like the crude death rate it is the lowest yet recorded.

It is interesting to note that this steadily falling infantile mortality rate is associated with a steadily rising birth rate. Ten years ago the infantile mortality rate was 251.7 and the crude birth rate 26.54. In 1929 the corresponding figures were 197.5 and 36.58 a decrease of 20% in the one case and an increase of 38% in the other.

The infantile death rates for the various nationalities show wide variations. For Chinese it is 191, for Indians 170, but for Malays it is as high as 292. The babies of the last are born into better hygienic conditions as a rule, than those of the Chinese but the ignorance and, may I say, the superstition of Malay mothers is much greater. They are less approachable and more difficult to convert to modern methods.

CORRECTED INFANTILE DEATH RATE.

It has been my custom hitherto to give a corrected death rate for infants, based on figures of immigrant infants supplied by the Chinese Protectorate. I received them for the first half of the year but was informed that in future it would be impossible for the Protectorate to continue to supply these. I think this figure is extremely valuable and necessary for the Commissioners in determining the value of their infant welfare branch and the amounts to be spent thereon, and I think every effort should be made, even to the extent of offering to pay for any extra clerical assistance required in the collection of the figure, to induce the Protector to supply the figure as before.

I give the correction for 1929 for what it is worth from the figures available. During the first six months of the year 4,845 infants arrived in the Colony. 857 of these were reported as leaving for other parts, leaving 3,988 to be added to our infant population. If we assume the same rate of immigration for the second half of the year the corrected death rate becomes 135.8 per 1,000. Even if we add 3,988 only to our infant population the corrected rate would be 160.9.

CERTIFICATION OF DEATHS.

The following return shows the number of deaths, the causes of which were certified by Medicalmen, the Coroner, and the Inspecting Registrars respectively:—

	Europeans	Eurasians	Chinese	Malays	Indians	Others	Total
Registrars ..	—	14	2,702	732	205	11	3,664
Medicalmen ..	49	81	7,045	408	622	96	8,301
Coroner ..	2	2	505	23	58	20	610
TOTAL ..	51	97	10,252	1,163	885	127	12,575

This gives a percentage of 29.1 certified by Registrars as against 28.9 last year. 66.0 by Medicalmen as against 65.1 last year and 4.8 certified by the Coroner as against 5.98 last year.

The percentages for the last 10 years have been as follows:—

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Registrars	36.8	36.1	35.1	37.3	35.0	33.9	34.1	30.1	28.9	29.14
Medicalmen	58.1	58.3	58.2	55.4	58.5	58.7	59.6	63.6	65.1	66.01
Coroner	5.0	5.4	6.5	7.1	6.3	7.2	6.2	6.2	5.9	4.85

V. REGISTRATION OF BIRTHS AND DEATHS.

The numbers registered at the different offices were as follows:—

	Births.	Deaths.
Central Office	1,331	3,154
Prinsep Street Office	9,596	5,130
Kreta Ayer Office	5,566	3,761
Joo Chiat Office	1,058	530
	17,551	12,575

Twenty nine births and three deaths were registered in the Post Registration Books and the sum of $306 was received in late registration fees.

VI. & VII. ANALYTICAL & BACTERIOLOGICAL LABORATORIES.

The reports of these are appended. I shall not attempt to synopsise them. They should be read in their entirety as they are brimful of interest.

In addition to carrying out the rapidly increasing public health routine work, both Mr. Willgress and Dr. Gilmour have found the time to undertake several useful pieces of research. Both officers are to be congratulated on the highly efficient and up to date manner in which their respective laboratories are conducted.

VIII. ANTI MOSQUITO WORK.

Full details of this work will be found in Dr. Dawson's report which is appended.

New Works.—New work was carried out in 11 areas. In these 18,587 yards of ditches of varying sizes were cut, 2,705 yards of concrete channels were laid and 7,977 yards of subsoil pipes were put down.

Existing Areas.—Extensions and repairs of these involved the laying of 3,962 yards of concrete channels and 3,547 yards of subsoil pipes.

The total amount spent on all Anti-mosquito work was approximately $145,000. During the year 6 maintenance gangs of 20 men were permanently employed on maintenance of existing areas. This number was increased to 8 in August. 2 gangs were permanently employed in Patrol work, 6 gangs on major new works and 2 gangs on minor new works. 10 masons and 10 labourers were also constantly employed.

During the year tidal gates were constructed on the Sungei Whampoa at Serangoon Road the purpose being to prevent the free access of sea water to the many acres of lowlying swamp adjoining the river. This experiment is being undertaken to see if it is possible by this means to prevent or certainly to limit the large amount of Ludlowi breeding which is known to take place in this area.

Before the gates were in operation a series of 100 samples of water were taken from selected ponds and pools. The nature and variety of mosquito breeding in these was noted while the samples were tested for percentage of sea water. This percentage was found to vary from .04 to as high as 83.4. Ludlowi was found breeding in the latter sample but it was also breeding in a sample with as low a percentage of sea water as .9. Since the gates were closed regular monthly samples from the same selected points have been collected and examined. The salinity has already considerably decreased and so, too, has the amount of Ludlowi breeding. But this latter may of course be purely seasonal and no conclusions can therefore be drawn until observations have been made for at least a year.

Regular surveys were carried out during the year by the six field workers who also attended to any special investigations. The mosquito trap was set on 170 nights—mainly in the vicinity of the Whampoa Basin already mentioned. The Anopheline catch was A. Ludlowi 2,355, A. Hyrcanus 235, A. Kochi 174, A. Vagus 117, A. Tesselatus 5, A. Maculatus 1 and A. Karwari 1. 2,455 of these anophelines were dissected in the laboratory and 3 Ludlowi and 1 Hyrcanus showed malarial infection of the stomach. No salivary gland infection was found.

The infection of A. Hyrcanus is interesting and it may mean that we shall have to review our ideas, as we have been under the impression that A. Ludlowi was the sole possible culprit in this and similar areas.

Oiling was regularly carried out mainly in the Katong district and in the vicinity of the General Hospital. Nearly 2,500 gallons a month of oil were used.

The usual Anti Stegomyia Campaign was carried out by the Sanitary Inspectors. Progress is heart breakingly slow in this direction as the mass of the people are too apathetic to help themselves to prevent this quite unnecessary nuisance.

GUNONG PULAI.

The average daily population throughout the year was 649. From being just over 1,000 in January it fell gradually, as the work neared completion, to just under 400 in December.

The malarial parasite was demonstrated in 152 cases. Of these 9 had been in residence 10 days or under, while 62 were known relapse cases. Substracting these we are left with 81, which must be taken as fresh Gunong infections. This gives a fever rate of approximately 125 per 1,000 per annum. The 1928 figure was 109.6.

Cases were fairly evenly spaced throughout the year, except for a sharp little outbreak in May and June, when there were 20 fresh cases. This outbreak was of some importance as several of the cases were amongst the senior staff, with the result that there was a good deal of dislocation of the work.

Though maculatus was found breeding to a slight extent in distant parts of the Reservoir, the fact that there was no evidence of a coincident proportionate increase of malaria amongst the labour force, seemed to indicate that the breeding place or places must be somewhere in the close vicinity of the senior officers' quarters. All the known seepages in the main valley below the quarters, which were on the regular oiling programme, were carefully searched to see if any had been overlooked but none were found neglected. After further prolonged searching, however, maculatus was found breeding in most unusual circumstances: (a) in an old biscuit tin thrown out near the bungalow and (b) several days later in a large galvanised iron tank used to supply condenser water to an air compressor. This latter had been out of use for some time previously.

In both instances maculatus was breeding in conjunction with stegomyia. This was the first time in my long experience I had found this happen. There was evidence of several generations of maculatus in the tank, showing that breeding had been going on for some little time, and I am reasonably satisfied this was the source of the malaria among the senior staff.

In some ways to find maculatus breeding in such unusual circumstances was a matter for congratulation in that it showed that the anti malarial measures were being efficiently carried out. At the same time it had its alarming side, as it is almost impossible to control the hundred and one suitable breeding grounds for stegomyia that one may find in and near a large construction camp. I was glad in one way however, that it did happen as it gave me the opportunity to draw attention to the lax way in which this matter of stegomyia breeding is treated. Much too much is left to the medical officer and the sanitary inspector. Jubillee wagons, skips, barrels, pipe bends, etc., etc., in spite of repeated warnings, are to be found stored in such a way that they must catch and retain water when they could just as well have been disposed of in such a manner as to render this impossible.

Toward the end of the year I visited with the Water Engineer and advised as to the siting of the permanent quarters and coolie lines, and also as to the extent of the existing anti-malarial work which should be permanently maintained. The main stream has been concreted and its walls revetted for a distance of nearly a quarter of a mile below the Dam. If, in addition, the Paradise Valley subsoil piped ravine floors are kept in the condition they are in now, the hillsides being allowed to revert to undergrowth, there should be little or no malaria in the permanent labour force.

PONTIAN.

The average daily population was 1,462. The malarial parasite was demonstrated in 287 cases. Of these 34 developed malaria within 10 days of taking up residence while 106 were definitely labelled relapses. This leaves us with 146 who are taken to have contracted malaria in Pontian, a fever rate of 100 per 1,000 per annum. The 1928 figure was 81.2.

During the year most of the permanent seepages were piped. As was expected several new seepages appeared in the floor of the reservoir above the sub dam, due no doubt to the holding up of the subsoil water by the piling and concrete core of the dam. These wet areas it was possible to treat by trenching and leading to a main ditch.

Peg 62 stream, which was originally cleared, deepened and straightened and generally rendered fairly safe, gave trouble during the year. This was entirely due to the careless way in which a contractor had recovered sand for the works, from the valley floor and the stream itself. His method was to cut deep bays, wherever he found a good deposit, leading away from the stream bed into the valley floor. In many instances he dug these bays so deep as to be lower than the stream bed level with the inevitable result that permanent pools were formed. Moreover he deposited the recovered sand in heaps on the valley floor and the weight of these heaps formed an added obstruction to the subsoil water flow and further seepages were created between the hillfoot and the sand heaps.

The least costly method of repairing the mischief was to again deepen the stream by several feet and further lower the water table. Luckily the fall was large enough to permit of this.

Unfortunately the mischief did not end here. The digging out of the sand meant that most of the valley floor and the banks of the stream were denuded of the more or less permanent vegetation that held them together. This left everything in a very friable condition and the result now is that every heavy shower erodes more and more into the banks and a large amount of silt is carried down. Owing to this the stream, in its lower reaches, silted as much as three or four feet. This in turn introduced a new danger. The stream in question is really a large ditch which was cut originally to help to dry out the large swamp in front of the village, which it did quite successfully. This swamp from having been dried out had its subsoil water level again raised by the amount of the silting and there was the danger of the formation of permanent pools which, in the heavy undergrowth, might be difficult to detect. Silt traps were tried but proved of little value. Finally a contract had to be let to clear the stream to its original level. The rather primitive methods employed by the contractor make this somewhat expensive but there is no help for it. I am afraid it will have to be done several times a year and certainly after the rains.

The same condition of affairs was brought about, though to a much lesser degree, in the Quarry stream.

A lack of foresight in claiming the new road, from the main road to the village, as our own, resulted in another menace. Right on the edge of our reserve and on the limits of our protected area a small village has sprung up. The area outside our reserve has been cleared and planted in pines and rubber while small vegetable gardeners are daily encroaching on the jungle and opening up more and more breeding grounds. While these are far enough away not to be a serious danger in themselves they are a danger to the inhabitants of the aforesaid village. And the danger to us is to be found in the " attractions " of the village. Our coolies frequent the village of an evening and doubtless many of them sleep there overnight and most likely contract malaria there.

It was found on investigation that several of our employees were permanently housed in this village owing to the fact that our building programme had not kept pace with the increase in the labour force. This has now been speeded up while we are also building shops inside our protected area. These will be offered to the present shopkeepers in the village complained of and by this means it is hoped to freeze out the village altogether.

In a way it is only supposition that much of the Pontian malaria was contracted in this village. But it has a little to support it as it is a fact that no member of the European Staff contracted malaria at Pontian during the year.

IX. SUPERVISION OF MIDWIVES & INFANT WELFARE.

The nurses paid 16,042 visits including 11,510 first visits, 3,119 revisits and 1,413 wrong addresses.

First visits.—Infants seen numbered 10,947 or 62.4% of the total births as compared with 61.9% in 1928. Of these, 194 were ailing and in 788 cases the cord was unhealthy.

There were 79 cases of twins. Infants not seen numbered 646 of whom 253 had been put out to nurse, 246 were still born, 8 had been removed, and 139 had died before a visit could be paid.

7,930 infants were being breast fed, 1 was receiving cow's milk, 2,488 tinned milk, 480 were partly on breast and partly on tinned milk, while 48 were receiving other suitable foods.

Of 2,923 bottles in use 354 were of unsuitable pattern while 146 were dirty.

The condition of mothers when first visited was satisfactory in 11,119 cases, and unsatisfactory in 267, while 99 had removed and 29 had died.

Of the mothers 86 were attended at birth by medical men, 281 by A class midwives, 7,586 by B class, 1,190 by C class, 2,123 by friends and 248 were unattended.

Of the 11,514 mothers 8,552 were living in cubicles or single rooms and 2,962 in houses of more than one room.

Revisits.—2,938 mothers and 2,867 infants were seen on revisits. Of the former 132 were in an unsatisfactory condition while 38 had removed, and 11 had died. Of the latter 163 were ailing, 56 had been removed, and 65 had died.

CLINICS.

During the year 15,908 new babies were taken on the Clinic registers.

In the Clinics 17,401 consultations were held by the Sisters in charge and by the Health Visitors on duty.

In the districts first visits were paid by the visitors to 12,279 infants in their houses. 62,226 subsequent visits were paid to these infants.

There were 8,888 removals and wrong addresses, while 999 of the Clinic babies were reported to have died.

Summarised, the work of the Clinics amounted to 101,803 visits to and consultations on 15,908 babies.

A third Clinic was opened in January in Joo Chiat Road in the Siglap Area which came into municipal limits in the beginning of the year.

A practical working arrangement which prevents overlapping was entered into with the Child Welfare Society early in the year. We now send monthly returns of all Clinic babies who have attained the age of one year, to the Society Clinics. On her last visit the Health Visitor instructs the parents where to take the child in future for advice or in emergency, at the same time leaving a card with the address of the nearest Society Clinic. Where it is thought, in the case of a weakly child, that it should not remain unvisited for too long a period a special note is made against its name in the aforesaid monthly return.

The Child Welfare Society now refer all children under one year of age to the nearest Municipal Clinic.

During the year the Commissioners sanctioned the appointment of a full time Lady Medical Officer. Dr. Spence was appointed and took over charge of the work in August. In addition there are on the staff of this branch of the department seven sisters and fifteen Health Visitors.

MIDWIVES.

At the end of the year there were 449 midwives on the Register though naturally many of these are not in active practice. During the year registered midwives attended 11,757 cases.

The following shows the number and nationalities of cases attended by "B" and "C" class midwives.

Eurasians	149
Chinese	9,714
Malays	1,317
Indians	422
Others	79
	11,681

"A" class midwives attended	76
"B" & "C" class midwives attended	11,681
In Hospital there were	2,594
	14,351

The number of births registered was 17,551 (79 twin births) so that 82.1% of the mothers received some kind of skilled attention at the birth of their children.

It will be remembered in my 1928 report that I advised the appointment of whole time Municipal midwives, in place of the unsatisfactory arrangement whereby the Commissioners paid the fee, in necessitous cases, to any registered midwife. I also expressed the opinion that the privilege was being abused. Events have proved that it was grossly so. During the year the four midwives who were appointed were only called to 205 cases. Accordingly the services of two have been dispensed with, while the remaining two are employed to assist in the Clinics when not required for their usual duties.

X. FOOD SHOPS ETC.

Licences were issued for:—

471	Coffee Shops.
428	Eating Houses.
94	Meat Shops.
1	Fish Shop.
19	Bakeries.
3	Biscuit Factories.
35	Cake Shops.
10	Aerated Water Factories.
249	Milk Vendors.

It should be noted that the number of eatinghouses licensed during the year was 428 as against 265 in 1928. Much of this desirable result must be attributed, I feel sure, to the campaign against food hawkers and the deletion of certain streets from the lists specified for stall hawkers. This increase forms the best answer to those who are inclined to sympathise unduly with the hawker.

Late in the year, but too late to have helped to produce the result noted above we decided we must abate our demands somewhat with regard to property to be licensed as food shops. I have realised for some time that our policy of asking for complete reconstruction to give up full open area etc. was operating unfairly. In most cases the prospective tenant has to pay for the extensive alterations for which we have been asking. And sometimes it does not end there. As soon as he has settled in his new premises, in some cases the landlord immediately raises the rent. And the tenant cannot even protest.

Further I am convinced if we are to be successful in inducing the food hawker to take up licensed premises our demands must be abated because, as a rule, where the hawker plies his trade most freely, the property is old and insanitary and to make it satisfy our previous demands involved a very considerable outlay.

It has now been decided to grant a licence provided the house is roomy enough and the applicant is willing to provide commodious food preparation rooms and kitchen accommodation, subject of course to other necessary minor alterations and improvements.

Our policy of the past few years has resulted in a very great improvement in the eating houses all over the town. This change of policy therefore was not arrived at lightly nor without a certain amount of regret. It may seem to be rather a retrograde step but I am convinced it is necessary. We must simply try to minimise any possible evil that may arise from it by closer supervision and more frequent visits of inspection.

XI. PLACES OF PUBLIC RESORT.

Theatres, Hotels, Public houses etc. were inspected periodically and as often as required by the licensing authorities concerned.

This department no longer licenses lodging houses. Of these only two varieties are of real importance viz. native passenger lodging houses and Hadji lodging houses. The method at present followed, and it seems fairly satisfactory, is for the licensing authority to call for a report from this department on the sanitary condition of any building which it is proposed to license, before such license is granted.

XII. SLAUGHTER HOUSES.

279,522 animals were received for slaughter as compared with 248,169 in 1928.

The figures were as follows:—

	1928	1929
Pigs	188,785	222,246
Sheep	32,069	30,603
Goats	8,250	8,026
Bullocks	18,208	18,141
Buffaloes	857	506
TOTAL	248,169	279,522

30 animals were rejected as being unfit for slaughter, while the carcases of 2,864 animals (pigs 2,697) dead or diseased, were destroyed. 3,847 parts of diseased or injured animals were also destroyed.

23,093 Australian Sheep were received for slaughter (24,406 in 1928).

120 Australian cattle were slaughtered at the temporary abattoir in Bukit Timah Road (492 in 1928).

At the moment of writing the siting of the new general Abattoir is not yet settled. The choice has narrowed down to two sites—one in Kampong Bahru Road near the projected new Railway Station and the other on Bukit Berlayer. This latter is also served by a branch line of the Railway and is very suitable in other ways.

The progress in the construction of the new Pig Abattoir was disappointingly slow and at the moment of writing is not yet completed. So, too, with the reconstruction and enlargement of the Jalan Besar Abattoir into two separate sections—for Bullock and Sheep slaughtering.

At the end of the year the control of the Abattoirs was handed over to the Municipal Veterinary Surgeon.

XIII. OFFENSIVE TRADES.

456 licences for offensive trades were issued, the fees amounting to $3171.

350 of the total were for laundries. Many of these still do not comply with our full requirements. The great difficulty is to find premises which are commodious enough for the purpose and with drying grounds attached or near, in suitable areas. Many of the licences issued are for ironing only, the washing and drying being carried out in other licensed premises on the outskirts.

I mentioned in my report of last year a special experimental Buffalo Dairy. This was carefully supervised during the year and, as prophesied, quite a high standard of purity was obtained. It soon became evident however that we should never be able to relax the supervision and at the moment I am unable to decide quite what our policy should be in this direction. One of the greatest difficulties is the fact that the owners of milch cows and buffaloes are usually small men. They rent a stall or stalls in a big cowshed and it is almost impossible to get them to co-operate as they are suspicious both of each other and the owner of the shed.

XIV. BURIAL GROUNDS.

The number of burials in municipal grounds was as follows:—

	1929	Since opening.
Bidadari Christian Protestant Division	143	2683
French Roman Catholic Division	153	3105
Portuguese Catholic Division ..	62	1147
Pauper Division	640	10184
Bidadari (Mohamedan)	1128	6140
Pauper Division	115	594
Bukit Brown (Chinese) ..	691	3971
Pauper Division	1624	4092
Hindoo Cemetery	321	1310
Pauper Division	158	166
Cremations ..	96	448
Infectious Disease (Serang Road)	19	627
Yeo Chu Kang Road ..	0	555
	5152	35022

The Burial ground inspector made 2014 inspections during the year, and attended 32 exhumations.

The total number of burials inside Municipal limits for the year was 7,666, made up as follows:—

Europeans	56
Eurasians	112
Chinese	5,511
Malays	1,318
Indians	638
Others	31
	7666

In addition to Municipal cemeteries there are in use 19 Public and 92 private cemeteries, practically all Chinese.

XV. STAFF.

Mr. Willgress took over the duties of Analyst in succession to Mr. Harrington, retired, in January.

Dr. (Miss) Spence was appointed medical officer in charge of Midwives and Infant Welfare work and arrived from England in August. District sisters. Miss Ramsay and Miss Cacace, joined the Infant Welfare department in March and July respectively.

Mr. Wilson, Divisional Sanitary Inspector, was appointed Superintendent of Abattoirs in September vice Mr. Holley retired.

Mr. MacMahon, Market Inspector, while on leave in England was successful in obtaining the meat certificate of the Royal Sanitary Institute.

Sanitary Inspectors Perry, C. A. De Souza and Mathieu after being seconded for six months were successful in obtaining the diploma of the Royal Sanitary Institute.

HEALTH OF MUNICIPAL STAFF.

The number of cases of sickness treated was 12,411. There were 850 sent to hospital and 178 to various Clinics. 15,254 days sick leave were granted. 11,290 dressings were applied at the Dispensary where the daily attendances totalled 26,447. Private practitioners treated 269 cases and Dr. Thurai, the medical officer in charge of staff, paid 291 visits to patients in their homes.

XVI. GENERAL.

There were 4,675 notices including 857 intimations served during the year which with 745 from the previous year made a total of 5,420. Of these 4,860 were complied with.

There were 78 arrest cases mostly for selling milk without licence.

There were 50,988 visits of inspection paid by the Sanitary Inspectors, 3,265 prosecutions with 2,600 convictions with fines imposed amounting to $14,704.95 while 665 prosecutions were withdrawn.

The following reports and returns are appended.

Anti Mosquito Report.
Report of the Analyst.
Report of the Bacteriologist.
Report of the Superintendent Middleton Hospital.
Return of Inspector's Prosecution, etc.
Return of Notices.
Summary of Arrest Cases.
Return of Licences for Offensive Trades.

In conclusion I have to thank all members of the staff for their loyal co-operation throughout the year.

I have the honour to be,
Sir,

Your obedient servant,
P. S. HUNTER,
M.A., M.B., Ch.B., D.P.H.,

Municipal Health Officer.

MUNICIPAL HEALTH OFFICE,
Singapore, 3rd February, 1930.

THE MUNICIPAL HEALTH OFFICER.

SIR,

I have the honour to forward the following report on Anti-mosquito measures carried out in the Municipal Area during the year 1929.

ANTI-MALARIAL WORKS.

New works were commenced or continued in the following areas, in all of which breeding places of dangerous anopheline mosquitoes were found.

1 Area No. 109 — Mount Pleasant Ravine.
2 ,, ,, 110 — MacRitchie Reservoir Ravine.
3 ,, ,, 111 — Thomson Road.
4 ,, ,, 113 — Kheam Hock Road.
5 ,, ,, 114 — Dunearn Road.
6 ,, ,, 115 — Alexandra Road.
7 ,, ,, 107 — Wayang Satu.
8 ,, ,, 100 — Adam Park.
9 ,, ,, 85 — Ewe Boon Road.
10 ,, ,, 112 — Rangoon Road School.
11 ,, ,, 116 — Sungei Whampoe.

AREA No. 109—MOUNT PLEASANT RAVINE.

This ravine runs in a westerly direction from Thomson Road and lies between Mount Pleasant and Bukit Brown Cemetery. Clearing the floor of the ravine of all trees, crops and undergrowth was carried out. Seventy one ponds were drained and levelled off, and 2585 yards of main earth drains and 2882 yards of subsidiary drains were cut.

AREA No. 110—MACRITCHIE RESERVOIR RAVINE.

This area runs in a westerly direction from Thomson Road and lies between Bukit Brown Cemetery and MacRitchie Reservoir. Extensive clearing of trees, crops and undergrowth was carried out in the ravine floor and 66 ponds were drained and levelled. 2451 yards of main earth drains and 5705 yards of subsidiary drains were cut.

AREA No. 111—THOMSON ROAD.

This area embraces the ravine running parallel to Thomson Road from the Whampoe Bridge in Thomson Road to the overflow from MacRitchie Reservoir.

More than a thousand trees were felled in this area and thirty one ponds were drained and levelled.

1321 yards of main earth drains were cut.

AREA No. 113—KHEAM HOCK ROAD.

This area is a short ravine running parallel to Kheam Hock Road. The ravine floor was completely cleared, several ponds and wells were filled, and 280 yards of earth drains were cut. A two-feet Hume pipe culvert was laid under a reserve road.

AREA No. 114—DUNEARN ROAD.

This area embraces a short ravine running at right angles to Dunearn Road between Kheam Hock Road and Wayang Satu.

The ravine floor was cleared of trees, undergrowth and crops, 33 ponds were drained and levelled, and 17 wells were filled.

500 yards of main earth drains were cut and 2343 five-inch subsoil pipes were laid to drain seepages.

AREA No. 115—ALEXANDRA ROAD.

This area embraces the ravines in which are the headwaters of the Berlayer River which discharges into the tidal creek near the junction of Telok Blangah and Alexandra Roads.

The clearing of trees and crops from the ravine floor was commenced in November. 330 yards of earth drains were cut and 14 ponds were drained and levelled.

A forty-two inch Hume pipe culvert was laid under a road reserve. Work is in progress.

AREA No. 107—WAYANG SATU.

Work was continued in this area. The main earth drain at its junction with the Bukit Timah Canal at Wayang Satu was diverted for a distance of 363 yards to conform with the future layout of the area.

The main earth drain at the head of the ravine near Kheam Hock Road was extended for a distance of 170 yards.

31 ponds were drained; 39 wells were closed, and considerable clearing of trees, crops and undergrowth was carried out. The earth drains in the heads of ravines were replaced by concrete invert channels with concrete slab revetment for a distance of 4488 feet. In all, 2386 feet of eighteen-inch concrete inverts, 8 feet of fifteen-inch inverts, 122 feet of nine-inch inverts and 1972 feet of twenty-one inch inverts were laid.

6778 eight-inch subsoil pipes and 5916 five-inch subsoil pipes were laid to drain seepages. Work is in progress.

AREA No. 100—ADAM PARK.

Further clearing was carried out in this area. The main earth drains were replaced for a distance of 2798 feet by concrete invert channels with concrete slab revetment.

1932 feet of eighteen-inch concrete channels, 38 feet of twelve-inch concrete channels, 828 feet of fifteen-inch concrete channels and 2438 concrete revetment slabs were laid.

5614 five-inch subsoil pipes, 2847 eight-inch subsoil pipes, and 275 six-inch subsoil pipes were laid to drain seepages.

AREA No. 85—EWE BOON ROAD.

The main earth drain in this area was replaced by a concrete invert channel with slab revetment.

748 feet of eighteen-inch concrete inverts and 10 feet of nine-inch concrete inverts were laid.

525 five-inch subsoil pipes were laid to drain seepages.

AREA No. 112—RANGOON ROAD SCHOOL.

A dangerous anopheline breeding ground in the school compound was drained. The existing concrete invert channel running alongside the school playing field was lowered two and a half feet for a distance of 313 feet and extended for a distance of 70 feet by a twelve-inch concrete invert channel with slab revetment.

434 five-inch subsoil pipes were laid to drain the swampy ground in the school compound the pipes being led to discharge into the open concrete channel.

AREA No. 116 SUNGEI WHAMPOE.

This area embraces the Sungei Whampoe and the neighbouring tidal creeks and ponds between the Whampoe Bridge in Serangoon Road and the bridge in Thomson Road. A tidal gate was constructed immediately above the Whampoe Bridge in Serangoon Road with the object of shutting out tide water from the area and controlling the numerous breeding places of Anopheles ludlowi.

MAINTENANCE OF EXISTING WORKS.

Routine maintenance was carried out in all the scheduled anti-malarial areas as detailed on page 82D of the annual report for the year 1928.

Extensions and repairs to existing works were carried out as follows:—

AREA No. 106—JALAN BESAR.

The main earth drain through the 'New World' grounds was replaced by a fifteen-inch concrete invert channel for a distance of 466 feet.

AREA No. 104—KATONG.

Four of the wooden tide gates in the bunded area were replaced by Hume pipes bedded in cement and fitted with iron tide flaps. The main earth drain between Grove Road and Meyer Road was replaced by a twelve-inch concrete invert channel with slab revetment for a distance of 716 feet.

AREA No. 83—SWISS COTTAGE ESTATE.

1573 eight-inch and 1040 five-inch subsoil pipes were laid to drain seepages, and 435 concrete revetment slabs were laid in a subsidiary concrete invert channel.

AREA No. 35—TIONG BAHRU.

1745 eight-inch subsoil pipes were laid in the ravines in this area before the ravines were filled over in the course of Improvement Trust works.

AREA No. 70—CHANCERY LANE.

The earth drain along the foot of the hill below Gilstead Road was replaced by a concrete invert channel. 1600 feet of fifteen-inch concrete inverts, 730 feet of twelve-inch concrete inverts, 255 feet of nine-inch concrete inverts and 19 concrete revetment slabs were laid.

157 four-inch and 280 five-inch subsoil pipes were laid to drain seepages.

3000 cubic yards of earth were used to fill a pond in Gentle Road.

AREA No. 12—SCOTTS ROAD.

The main earth drain in this area was replaced by a fifteen-inch concrete invert channel for a distance of 766 feet.

AREA No. 9—NASSIM AND DALVEY ROADS.

The twelve-inch concrete invert channel was extended for a distance of 202 feet.

54 five-inch and 598 four-inch subsoil pipes were laid to drain seepages.

AREA No. 29—ORCHARD ROAD.

The earth drain in this area was replaced by an eighteen-inch concrete invert drain with slab revetment for a distance of 708 feet.

AREA No. 7—GLENCAIRD.

482 feet of twelve-inch concrete invert channels were laid in this area.

AREA No. 25—MORSE RAVINE.

20 eight-inch and 360 four-inch subsoil pipes were laid to drain seepages.

AREA No. 6—CUPPAGE ROAD.

A fifteen-inch concrete channel was laid for a distance of 548 feet.

AREA No. 5—CLUNY RAVINE.

The old subsoil pipes at the head of the ravine were taken up and replaced by a twelve-inch concrete invert channel for a distance of 200 feet.

AREA No. 15—WOODLEIGH FILTERS.

200 feet of twelve-inch concrete channels were laid.

AREA No. 37—WOODNEUK.

The main earth drain was replaced by a concrete invert channel with slab revetment.

676 feet of eighteen-inch channels, 338 feet of fifteen-inch channels and 35 feet of nine-inch channels were laid.

370 five-inch subsoil pipes were laid to drain seepages.

AREA No. 71—TANGLIN POST OFFICE.

366 feet of fifteen-inch concrete channels, 80 feet of nine-inch concrete channels, and for the drainage of seepages 74 five-inch subsoil pipes were laid.

AREA No. 80—ECONOMIC GARDENS.

An earth drain in this area was replaced by a twelve-inch concrete invert drain with slab revetment for a distance of 828 feet.

AREA No. 38—ALEXANDRA SWAMP.

655 five-inch subsoil pipes were laid to drain seepages.

AREA No. 31—PAYA GOYANG.

1032 feet of twelve-inch concrete inverts, 97 feet of nine-inch inverts and 488 fifteen-inch revetment slabs were laid.

AREA No. 10—FERNHILL.

464 five-inch subsoil pipes were laid.

AREA No. 69—BALESTIER ROAD.

324 feet of nine-inch concrete invert channel was laid, and for the drainage of seepages 351 feet of four-inch subsoil pipes and 280 five-inch subsoil pipes were used.

AREA No. 73—MANDALAY ROAD.

206 feet of five-inch absoil pipes were laid.

AREA No. 57—BUKIT TIMAH GOLF COURSE.

931 five-inch subsoil pipes were laid.

AREA No. 19—SINGAPORE HARBOUR BOARD RESERVOIR.

900 five-inch subsoil pipes were laid to drain seepages.

AREA No. 18—HAMMER & CO'S RESERVOIR.

264 five-inch subsoil pipes were laid.

AREA No. 41—GALLOP ROAD.

The main earth drain in this area was deepened and widened, and the work of replacing this drain by a concrete invert channel was commenced.

856 feet of twenty-one inch concrete invert channel with slab revetment were laid. Work is in progress.

AREA No. 2—BARKER ROAD.

125 five-inch subsoil pipes were laid to drain seepages.

AREA No. 8—KING'S ROAD.

274 five-inch subsoil pipes were laid.

AREA No. 92—HOLLAND PARK.

300 five-inch subsoil pipes were laid.

OTHER AREAS.

Minor repairs and extensions were carried out in other areas.

MOSQUITO SURVEYS.

Systematic surveys were carried out during the year and 2,014 collections of mosquito larvae were examined and identified in the laboratory.

Collections of adult mosquitoes were made on 170 nights during the year by means of mosquito traps. The following total catches were recorded:—

A. ludlowi 2,355, A. hyrcanus 235, A. Kochi 174, A. vagus 117, A. tesselatus 5, A. Maculatus 1, and A. karwari 1. Of these 2,455 were dissected and malarial infection, diagnosed on the presence of oocysts in the stomach wall of the mosquito, was found in three A. ludlowi and one A. hyrcanus.

GENERAL ANTI-MOSQUITO WORK.

Patrol gangs cleared and regarded 584,753 yards of earth drains, filled 230 ponds and 160 wells, and collected 10,852 baskets of tins.

Mosquito larvae were found by Sanitary Inspectors in the course of their ordinary rounds in 12094 houses and compounds or 23.71% of those visited.

661 Notices under the Destruction of Mosquitos Ordinance were served during the year.

28914 gallons of Anti-malarial mixture were used in spraying mosquito breeding places, the bulk of the oiling being done in the valley of the Singapore River and in the swampy districts in Katong.

I have the honour to be,

Sir,

Your obedient servant,

W. DAWSON,

Deputy Health Officer.

Singapore Municipality

Twenty Second Annual Report

of the

Municipal Chemical Laboratory

For the Year

1929

by

R. E. WILLGRESS, A.R.C.S., BSc., A.I.C.

MUNICIPAL HEALTH OFFICE.

Singapore, 30th January, 1930.

The Municipal Health Officer.

Sir,

I have the honour to submit herewith the 22nd annual report of the chemical work carried out in the Municipal laboratory for the year 1929.

During the year the number of samples analysed was 16,307, the detailed figures for which are given in the following table.

Water.	Routine samples from Singapore island ..	10,076
	Routine samples from Johore	271
	Special samples from Johore	241
	Well waters	21
	Miscellaneous waters	14
Sewage.	Routine samples from Alexandra Road Works ..	2,342
	Special samples from Pumping Stations etc., ..	1,237
	Special samples from Alexandra Road Works ..	95
	Sewage effluents from Private Installations ..	312
	Milks from Vendors (a) Licensed ..	171
	(b) Unlicensed ..	73
Miscellaneous.	Foods	172
	Samples from Health Department	501
	Samples from Engineering Department ..	136
	Samples from Electrical Department ..	252
	Samples from Water Department	328
	Samples from Gas Department	28
	Samples from Building Surveyor	1
	Samples from C.R.E.J.	35
	Samples from Fire Brigade Superintendent ..	1

MUNICIPAL WATERS.

The Municipal public water supply for 1929 was taken from the raw waters impounded at Mc. Ritchie and Pierce reservoirs, together with a very small quantity of raw water from the Johore catchment at Sultan Ibrahim reservoir, which was run into Pierce reservoir. For the latter half of the year this raw water from Johore was supplied, unfiltered, to Johore Bahru and H. M. Naval Base and this continued until the filter beds at Gunong Pulai were ready in December. The filtered water was first run into Pearls Hill service reservoir on the 30th December, 1929.

The characteristics of the water impounded at Gunong Pulai are very similar to those of raw water from Singapore island, the important differences being, however, that the Johore water contains more organic matter and iron in solution. This is seen from the following tables, which represent averages of many analyses performed during the last six months of the year (Table 1.)

COMPARISON OF ANALYSES OF RAW WATER FROM SINGAPORE ISLAND AND JOHORE,

	JOHORE		SINGAPORE
	Pulai III Catchment	Pulai II Catchment	Mc. Ritchie Reservoir
Total solids	5.4	5.4	5.4
Organic solids	2.7	2.7	3.2
Inorganic solids	2.7	2.7	2.2
Free and Saline Ammonia	0.001	0.001	0.002
Albuminoid Ammonia	0.003	0.003	0.004
Nitrogen as nitrites	Absent	Absent	Absent
Nitrogen as nitrates	—	0.010	0.014
Chlorine as chlorides	0.10	0.10	0.10
Oxygen absorption:			
1. In 3 minutes	0.038	0.048	0.011
2. In 4 hours	0.115	0.147	0.069
Iron	0.03	0.15	0.06
Carbon dioxide	—	0.60	0.29
PH value	7.5	7.5	7.5
Colour in Lovibond 2 foot tube Yellow	7.1	6.4	5.0
Red	2.8	2.4	2.2
Blue	2.0	1.8	1.5

The Pulai III sample was taken at the inlet to Pulai II pipe, the Pulai II sample was taken at a depth of 30 feet below the surface and the Mc. Ritchie reservoir sample just below the surface. The results are expressed in parts per 100,000.

SINGAPORE ISLAND WATER.

The routine samples which were analysed daily were collected from the catchment area streams and impounding reservoirs (Mc. Ritchie and Pierce reservoirs), from the filter beds. before and after filtration, and the clear water tanks at Woodleigh and Bukit Timah Road, from the high level service reservoirs and from the tap supply. The high level service reservoirs included the new storage at Fort Canning, which was examined daily from the 21st February.

There were no instances of any contamination with sewage matter and the water passed into the public supply has been uniformly good in appearance and has been free from the iron troubles which occurred regularly in previous years.

The raw waters from Pierce reservoir were "limed" continuously throughout the year and this water was aerated before filtration at Woodleigh. This addition of lime together with aeration kept the filtered water reasonably free from iron, which was deposited on the sand of the filter beds. This deposit of iron set up reduction processes in the water being treated, particularly noticeable when the bed had been working for a few weeks and was tending to get choked. The effect of this was to show definite traces of nitrites and higher free ammonia figures. There were 240 cases of these nitrites appearing during the year at Woodleigh beds, 22 of which occurred in the clear water tank. The appearance of the raw water was greatly improved from May onwards by adding aluminium sulphate for the first few hours only of starting up a new filter bed.

The raw waters from Mc. Ritchie reservoir were limed for 75 per cent of the year (an average of 18 hours per day). They received little or no aeration before filtration and the number of cases where nitrites appeared in the filtered water was only 13. The addition of aluminium sulphate was carried out similarly to Woodleigh water.

The dose of lime was approximately half of a grain per gallon.

All the filtered water from Woodleigh and Bukit Timah Road was chlorinated with a dose of approximately 0.33 parts per million.

The average values for the year of the iron in the two impounding reservoirs and in the tap supply were as follows:—

	IRON IN PARTS PER 100,000	
	Range	Average
Mc. Ritchie reservoir	0.02/0.10	0.06
Pierce reservoir	0.02/0.14	0.06
Tap supply	0.02/0.08	0.03

It is seen that the tap water has never reached the limit of 0.10 parts of iron, at which concentration the water becomes troublesome.

The colours of the filtered samples have been very good throughout the year although they would have been even better if the Bukit Timah beds had worked as well as those at Woodleigh. The colours, as seen through the standard Lovibond tintometer, had the following values for yellow:—

Unfiltered supply	Values for yellow
(a) Woodleigh	6.9
(b) Bukit Timah Road	7.0

Filtered supply	Values for yellow
(a) Woodleigh	1.4
(b) Bukit Timah Road	2.0
(c) Tap supply	1.4

The yellow colour for the tap supply ranged from 0.8 to 2.5.

An analysis of the tap supply of Singapore gave the following results:—

Singapore Tap Supply

		Parts per 100,000
Total solids		1.68
Organic solids		1.08
Inorganic solids		0.60
Free and Saline Ammonia		0.001
Albuminoid Ammonia		0.0025
Nitrogen as nitrites		Absent
Nitrogen as nitrates		0.004
Chlorine as chlorides		0.1
Oxygen absorption:		
1. In 3 minutes		0.006
2. In 4 hours		0.031
Iron		0.03
Carbon dioxide		0.27
PH value		7.6
Colour in Lovibond 2 foot tube	Blue	1.2
	Red	0.2
	Yellow	0.5

JOHORE WATER.

The water from Johore is collected from two catchment areas viz. Pulai II and Pulai III, the latter being connected to the former by a pipe line. These catchment areas supply Sultan Ibrahim reservoir. At the beginning of the year this water was used as a camp supply at Gunong Pulai and complaints were received in April regarding its quality.

It was found that filtration through the temporary sand filter was doing little good and the water was discoloured and smelt very bad. Investigation brought to light the fact that the water from the reservoir was abnormally high in iron and that the high level temporary storage tank contained large deposits of iron compounds. The amount of aeration which the water was subjected to was sufficient to deposit this iron in the pipes and storage tanks. After these tanks had been cleaned out and were kept in good order the camp supply improved and no further complaints were received. It was then thought advisable to investigate very fully the characteristics of the reservoir supply and routine samples, taken at intervals of 10 feet from the surface to the bottom of the reservoir (80 feet to 100 feet deep) were analysed at regular intervals throughout the remainder of the year. It was found that the iron content was quite normal at and near the surface but it gradually increased with the depth until the bottom water contained as much as 0.40 to 0.60 parts per 100,000. After the water had been impounded for some time however it was found that, although the top layers were still comparatively good, the iron in the lower layers had become fairly uniform in strength throughout. These facts are brought out in the following table.

Sultan Ibrahim Reservoir.

Iron Contents at various depths.

Depth below surface in feet.	Analyses done in:—	
	May	November
Surface	0.02	0.02
10	0.03	0.05
20	0.06	0.07
30	0.14	0.12
40	0.14	0.18
50	0.15	0.28
60	0.20	0.36
70	0.26	0.34
80	0.28	0.30

This information has proved useful in that the raw water for filtration etc. should as far as possible be taken from the surface of the reservoir and, in addition, any water which has to be run to waste should be taken from the lower levels of the reservoir.

The quantity of lime necessary to remove this iron from water taken at 30 feet depth is approximately 1.5 grains per gallon i.e. three times the quantity needed for Singapore raw water. When the necessary plant for aeration of this ferruginous water is installed, the quantity of lime may probably be lowered.

Towards the end of the year routine daily samples collected from the streams and reservoir and from the filter beds and clear water tank were examined and were found in all cases to be free from any traces of sewage contamination.

Complete analyses of samples taken from the stream at Pontian Kechil were undertaken monthly. The water from this source appears to have very similar characteristics to that of Gunong Pulai but it will be examined more closely when impounding takes place.

WELL WATERS.

The 21 samples of well water were taken from the following places—Thomson Road, Balmoral Road, Stevens Road, Cairn Hill Road, Spottiswoode Park Road, Tanglin Road and Geylang. With the exception of 3 samples from Thomson Road, all showed definite signs of contaminatination with unoxidised sewage and the wells were condemned.

MISCELLANEOUS WATERS.

The 14 samples examined for drinking purposes were all collected from Mandai Quarry, where the supply is chlorinated with "Caporit." With the exception of one sample, all contained excess of free chlorine and were safe for drinking purposes.

SEWAGES, EFFLUENTS ETC., FROM THE MUNICIPAL SEWAGE WORKS.

There have been several important additions and various alterations to the purification system at the Municipal sewage works at Alexandra Road and from the 19th July onwards all the sewage pumped to the works from the three pumping stations in Singapore has been subjected to efficient purification before flowing into the stream at Alexandra Road. In addition to the 17 old coral beds which have been in operation for many years, 21 new ones have been constructed and these were treating sewage for the latter six months of the year. Alterations to the sedimentation tanks have resulted also in increased efficiency.

The daily routine samples received for analysis were made up from a mixture of samples taken every two hours from each part of the purification plant. Formerly only one sample was collected daily from each part of the purification system and it has bas been proved that such a sample is not a representative one, on account of the hourly variations in the character of the sewage treated. The crude sewage at the works is always strongest between 11 a.m. and 3 p.m. and is relatively week between 1 a.m. and 7 a.m. It has accordingly been impossible to make a fair comparison between the type of sewage treated during the year with that treated during previous years. The following table, made up from previous annual reports of my predecessor, Mr. Harrington, tends to show however that the present sewage is definitely weaker in character than that of past years.

Comparison of Analyses of Crude Sewage treated during the last 6 years.

Parts per 100,000	1924	1925	1926	1927	1928	1929
Free Ammonia	10.1	4.4	4.1	6.0	4.8	3.6
Albuminoid Ammonia . .	6.1	4.1	3.2	.63	1.41	.70
Oxygen absorption in 4 hours	17.87	16.93	16.65	8.69	7.77	6.18
Suspended matter	98.0	88.0	90.2	56.0	45.0	36.4
Chlorine as chlorides . .	81	153	168	123	60	86

This improvement is, I assume, due to the extension of the sewerage system with the consequent falling off in the relative quantity of night soil dumped at the pumping stations.

The effect of night soil dumping on the character of the sewage has been arrived at by making a series of analyses of the sewage at Central and at Southern Pumping stations. At the Southern station at People's Park there is daily dumping whereas Central Station in River Valley Road receives none. Typical analyses of sewage from each of these stations are given below.

Comparison of Analyses of Crude Sewage pumped at Central and Southern pumping stations.

Parts per 100,000	Central	Southern
Free Ammonia	3.8	6.1
Albuminoid Ammonia	.51	.81
Oxygen absorbed in 4 hours	5.2	13.8
Suspended matter	33.5	64.4
Chlorine as chlorides	10	67

The results indicate that Southern pumping station is dealing with a very much stronger sewage, which compares with the type of sewage treated by the Alexandra Road works several years ago.

The daily analyses carried out have been averaged month by month and the results for the year are given at the end of this report. These tables show both averages and ranges of value obtained.

The table of crude sewage analyses (Table 1) points to the fact that the strength has remained fairly constant throughout the year.

Detritus Tanks.—These tanks, designed to abstract the heavier solids such as sand etc., from the crude sewage have worked uniformly and well throughout the year. The solids in suspension in the crude sewage ranged in value from 22.5 to 59.0 during the year, giving an average of 36.4 parts per 100,000.

The solids in suspension in the effluent from the Detritus tank varied between 19.5 and 50.0, with an average value for the year of 33.0 parts per 100,000.

The average retention of solids in these tanks has therefore been 9.35 per cent throughout the year, the percentages for each month of the year (January to December successively) being as follows:—7.7, 10.0, 8.9, 9.3, 9.4, 6.5, 9.4, 9.4, 5.4, 10.9, 10.5, and 14.15. The efficiency of these tanks has been tending to increase throughout the year, due probably to alterations to the arrangement of the tanks, thus enabling more frequent desludging.

Imhoff Tanks.—The old tanks, numbering 24, have been widened and eight new tanks constructed. The arrangement of these tanks is such that the sewage can be passed through from either end and thus prevent accumulation of settled solids at one end of the tank. These changes have resulted in greater efficiency, the amount of solids in suspension which have settled out in these tanks having increased approximately 20 per cent. The solids in suspension in the effluent from the Imhoff tanks ranged in value from 14.0 to 37.0, with an average value for the year of 25.6 parts per 100,000. The average retention of solids in these tanks was 20.3 parts per cent, the monthly retentions ranging from 18.7 to 24.7 per cent.

Filter beds.—The filtration system has been extended by the construction of 21 new coral beds, making a total of 38. For purposes of sampling and general convenience these beds have been classified under the following headings:—

Old Coral beds Nos. 1 to 8	Block "A"
Old Granite beds Nos. 9 to 17	Block "B"
New Coral beds Nos. 18 to 28	Block "C"
New Coral beds Nos. 29 to 38	Block "D"

The average analyses and ranges of value of the effluents from each of these blocks of filter beds, taken over the whole year, are shown at the end of my report in Tables 2 and 3.

These results show that the old coral beds in Block A are working a little more efficiently than the granite topped beds in Block B.

The 21 new beds appear to be ripening rather slowly and the effluents in December, that is, after about six months of working, were not so good as those from the old filter beds.

Table 2 shows that the effluents from the 17 old beds (Blocks A and B) became worse in August, although this was the month when the 21 new beds were all in operation for the first time. This at first sight appears anomalous but the explanation is probably to be found in the fact that no unpurified sewage was bye-passel into Alexandra Road stream after the 19th July. As I have no details available of the quantity of sewage which was bye-passed before July, it is difficult to make a definite statement of the work done by the 17 old beds before and after July. From the fact that the effluent suddenly went off, however, at this time, it is fairly safe to assume that the 17 old beds had more work to do from July 19th onwards, when the new beds were put in operation.

CHLORINATION OF IMHOFF TANKS' EFFLUENT.

Due to the non-arrival of stocks of liquid chlorine, no chlorination of the sewage treated by the percolating filter beds was commenced this year until August. In fact the chlorination was started practically one month after the bye-pass valve had been shut. The conditions then were that the 17 old beds were doing more work, with a consequent falling off in the quality of the effluent, and the 21 new beds were slowly ripening. Except over a few short periods when the chlorinated sewage was passed to the 21 new beds, the procedure has been to chlorinate the sewage passing to the 17 old beds. Chlorination took place one week in every three, the dosage being applied for eight hours per day using three pounds of gas per hour.

I estimate that the amount of chlorine passing to these old beds in 24 hours was approximately 1.5 parts per million. In the original experiments carried out in 1926 by my predecessor, Mr. Harrington, the dosage was 2 parts per million concentration or 0.66 parts per million in 24 hours i.e. approximately one half of the present dosage.

In attempting to arrive at the effects of chlorination, which was started originally to remove the slimy growths which form on the coral, several variable factors have to be taken into consideration e.g. variations in the strength of the sewage treated, uniformity of working conditions of percolating filters (such as amount of "resting" the beds get, the amount of "hand picking" carried out) and rainfall.

The variations from day to day in the strength of sewage treated are mainly caused by variations in rainfall, amountings as it does to four inches or more in one day. Comparisons show that these variations are often considerable, being probably much greater than one would expect from chlorination experiments. I understand that the 17 old beds have "ponded" considerably during the year being constantly clogged with the slimy humus deposit.

I have compared very carefully the daily chemical analyses with a view to deciding whether the beds have worked better during the periods when they were treating chlorinated sewage but with very little success. With possibly one or two exceptions, there was no marked improvement in the effluent from the beds after several days of chlorination. Looking through previous annual reports, I notice that the marked improvement effected by chlorination when started in 1926, was not maintained in

1927, the explanation put forward being that the beds were getting more choked with humus. I am of the opinion that the chlorination is having a beneficial effect, however, as the effluents from the old beds have been slowly but steadily improving since August, when they "went off" so badly. This improvement is probably only partly attributable to chlorination as the beds were "nursed" more during the latter part of the year. I consider that the dosage should be increased and should be applied to the particular beds which appear to require freshening. This might be done by making alterations to the present plant whereby the sewage passing to any one bed could be chlorinated by the Chloronome plant independently. Care would have to be taken that the bacterial life in the beds is not killed. Some small experiments which have already been carried out using fairly strong doses of bleaching powder solutions on the filter beds have proved quite successful. The price of the chemical however is much higher than liquid chlorine. Experiments using chlorine along these lines (described in Eng. News Record 1929, 102, 621-622), in which the chlorine was added in sufficient quantity to leave a residual amount of 0.5 to 5.0. parts per million have proved effective in freeing supply pipes, nozzles and bed surface of slimy growths. The chlorination is apparently best at night when the flow was low and the sewage weak.

COMPOSITION OF SCUM FROM SEDIMENTATION TANKS AND CORAL BEDS.

Analyses were carried out regularly of the scum which forms to a small extent in the detritus tanks, and to a large extent in the Imhoff tanks and on the coral of the percolating filter beds. It was found that all these compounds have practically the same composition, the general type of analysis being as follows:

COMPOSITION OF SCUM.

		Detritus Tanks	Imhoff Tanks	Coral Beds
	% Moisture	90.7	84.9	88.6
Total % Organic Matter	Organic Matter	5.6	9.0	6.6
	Fat	1.9	3.3	2.5
	Nitrogen	.4	.5	.6
	% Inorganic matter	1.4	2.3	1.7

Analyses carried out on the bone dry samples showed fat contents (i.e. soluble in ether) ranging from 20 to 40 per cent, with small amounts only of inorganic matter (12 to 20 per cent).

A method which has been adopted for several months to break up this hard scum and cause it to settle is to force clear sewage from the central channel of the Imhoff tanks on to the scum layer.

SLUDGE DEPOSITED IN DETRITUS AND IMHOFF TANKS.

Analyses of the sludge removed periodically from these tanks showed that the solids in the Detritus tanks are, as one would expect, much higher in inorganic matter. Analyses of the dried sludges gave the following results:—

COMPOSITION OF SLUDGE.

		Detritus Tanks	Imhoff Tanks
Dried samples	Organic matter	39.9	66.0
	Inorganic matter	60.1	34.0

Gas evolved from Imhoff tanks. At the request of the President, I made analyses in September of the gas which is evolved from the Imhoff tanks. The gas consists essentially of methane and carbon dioxide and has an approximate calorific value (calculated) of 700 B. Th. U. per cubic foot. This is approximately 200 B. Th. U. higher than that of the town supply. The analyses obtained were as follows:—

COMPOSITION OF SLUDGE GAS.

Carbon dioxide	22.0%
Carbon monoxide	1.1%
Methane	72.9%
Nitrogen	4.0%
	100.0%

I understand that the question of utilising this gas is being considered. The literature of other countries on this subject tends to show that gas production in this tropical climate should be much higher than in temperate climates.

Just after the end of the year there was an instance of spontaneous combustion in one Imhoff tank—fortunately without any casualties.

FINAL PURIFIED EFFLUENT.

As mentioned previously in this report, the quality of the sewage effluent from Alexandra Road improved tremendously as soon as the byepass valve was closed in July, giving results which compare favourably with those of other countries. The quality of this effluent from August until the end of the year can be judged from the following average analysis:—

	Final Sewage Effluent (August to December 1929)
Free Ammonia	1.41
Albuminoid Ammonia	.11
Oxygen in 4 hours	1.18
Suspended matter	3.25
Chlorine as chlorides	106
Nitrates	.7

The complete average results for each month of the year are shown in Table 4 at the end of this report.

Bio-aeration Experimental Unit. A great deal of work has been done on working out the best conditions for the efficient running of this unit and I consider this method of purifying sewage is much better understood than it was at the beginning of the year.

The unit was working badly at the beginning of the year and with the exception of an excellent month's results in April, it gave unsatisfactory results until the beginning of July. In July, after practically two months spent in reconditioning the activated sludge, only one working condition was altered at a time and in this way some general conclusions were arrived at.

I am of the opinion that the unit will not treat at present more than an average volume of 200,000 gallons per day. Allowing for variations in the flow of crude sewage, this involves treating at the rate of 250,000 gallons during the day and less at night. With the exception of about one month, the unit treated sewage at this rate continuously until the end of the year. The rate in July averaged 250,000 gallons per day.

The chemical results obtained during these six months continuous run are shown in Table 5 at the end of this report. They compare very favourably indeed with the results from the 17 old filter beds, showing an average of 3.13 parts per 100,000 of suspended solids in the effluent.

The appearance of the sewage in the unit has, however, not kept so uniformly good. The activated sludge in the aeration channels has often "bulked" considerably, causing poor settlement of solids in the Dortmund tanks. This trouble has been very largely overcome by pumping away as much activated sludge as possible and keeping a minimum quantity in the aeration channels. The best conditions appear to be not more than 15% of sludge as given by settlement tests in one hour, so long as the settlement of solids in 24 hours does not get less than 5%. Even under these conditions the Dortmund tanks were often very cloudy and several experiments were tried to improve these appearances. Alumina, applied in doses of 25 parts per million to the incoming sewage and also to the sludge wells, did not show beneficial results. Chlorination of the incoming sewage, applied for 8 hours per day at daily dosages of 2, 6 and 18 parts per million was also tried. These experiments did not clear the Dortmund tanks or free the channels of the sulphurous growths which formed but the chemical results obtained led to the view that very small doses of chlorine are beneficial. The largest dose of chlorine finally killed all visible protozoal life in the activated sludge and the unit had to be put out of action at the end of the year.

The quality of the sewage admitted to the unit from July to December varied fairly considerably, the oxygen absorption in 4 hours ranging from 3.3 to 6.7, with an average of 5.1 parts per 100,000. The solids in suspension averaged 24 parts per 100,000 over this period. The amount of sea water in this sewage also showed considerable variations—the chlorine as chlorides ranging from 33 to 248 parts per 100,000 (i.e. one to twelve per cent of sea water).

If the activated sludge could be prevented from bulking, the unit should treat efficiently 200,000 and probably 250,000 gallons per day. The cause of bulking is still not solved although it seems likely that it depends largely on the character of the solids in suspension in the sewage, which brings one to the dumping of night soil at the pumping stations.

I understand that in works practice at home similar activated sludge units have to treat sewage with values for solids in suspension 12-18 parts per 100,000. Although this is not much lower than in the present unit, I consider, from the few experiments I have carried out, that the solids in Singapore sewage are more colloidal in character and tend to settle out very much less easily. I consider the line of future investigation should be to attempt the flocculation and quick settlement of these solids.

SEWAGE EFFLUENTS FROM PRIVATE INSTALLATIONS.

With the addition of many new installations during the year, the total number treating sewage from various houses now totals 85 (not including Government houses). During the year, 312 analyses of the effluents from the tanks and filter beds of 69 of these installations were made. The remaining installations were not examined, as a period of approximately six months is allowed to elapse for the tank and coral bed to ripen.

It cannot be said that these installations have been kept in really good order by the owners—particularly in regard to care of the tippers and the coral beds.

The filtered effluents from these installations have, however, been quite good, particularly in regard to the oxygen absorption values, which are often between 0.3 and 0.6 parts per 100,000. The solids in suspension have usually varied between 2 and 6 parts per 100,000. These effluents are, on the whole, probably better than are obtained at the Alexandra Sewage Works. With efficient control of these installations there is no doubt that the quality of the effluent could be of a very high standard.

There is practically no information available as to the length of time that a tank can work efficiently without needing to be desludged. There are several cases where tanks have worked without desludging for several years (2 to 3½ years) and are still yielding very satisfactory tank effluents, without any evidence of accumulations of solids in the tank.

In other cases tanks have given poor effluents shortly after being desludged.

With a view to arriving, if possible, at some general basis of working conditions for these tanks, I decided at the beginning of the year to make monthly analyses of the effluents from four typical installations. The ones chosen were:—

	Capacity of Tank	Type of Bed
No. 17	2,500 gallons	Double
No. 56	8,500 gallons	Single
No. 61	600 gallons	Single
No. 66	2,000 gallons	Single

The choice of installations proved rather unfortunate, as two of them were constantly neglected, with a consequent falling of in the quality of the effluents. These examinations will be continued through 1930 and I trust to make some generalisation in my next report.

The method of taking samples has also been studied and it has been found that samples taken about 9 a.m are as representative as a series of samples taken over the whole day.

The application of chloride of lime to clear the humus deposits in the coral beds is a possible and not expensive method and experiments which are now to be carried out may avoid the expense and delay of having to remake some of the beds.

MILKS FROM ITINERANT VENDORS.

Although the milk sold in Singapore is supposed to be supplied by licensed vendors only, there are a number of unlicensed men carrying on this trade. I assume that these men have been refused licenses on account of having previously been convicted of supplying adulterated milk. It has been found this year that the unlicensed men are more flagrant offendors regarding adulteration than the licensed men.

Of 171 samples from licensed vendors, 67 or 39.2 per cent were adulterated, whereas of 73 samples from unlicensed men, 48 or 65.8 per cent were found to be adulterated. With the exception of a few instances where the men deserted their carts and escaped, the unlicensed men were arrested and subsequently fined. A summary of the analyses is given below.

		Licensed Vendors	Unlicensed Vendors
Number of analyses	...	171	73
Adulteration with water	Number ..	66	48
	Per cent. ..	38.6%	65.8%
	Range ..	3.5% to 53.0%	2.4% to 51.8%
	Average ..	20.5%	20.0%
Deficiency in Fat	Number ..	10	2
	Per cent. ..	5.8%	2.7%
	Range ..	10.8% to 63.0%	16.9% and 21.6%
	Average ..	32.8%	19.25%

With one exception, all the milks which were deficient in fat also contained added water.

The supply of a standard quality of really good milk appears to be a question which will not be solved while the present conditions are in force. I should like to put forward as a suggestion that the supply and sale of fresh milk be run entirely under Municipal control.

FOODS.

The details of the analyses of various foodstuffs which I have carried out are as follows:—

Tinned milks.

(a) Natural	2
(b) Sweetened condensed	17
(c) Unsweetened condensed	8
Fresh milk for preservative	1
Reconstituted milks	50
Cream	1
Butter	4
Soda water	38

Highly coloured sweet drinks	16
Highly coloured native cakes	4
Flour, sago and rice	9
Tinned bean curds	5
Tinned mutton	1
Tinned sardines	2
Tea and tea dust	8
Beer	2
Toddy	1
Water from soda fountain	1
Pineapple syrup	1
Preservative for pineapple	1

Milks. All the samples of condensed milk bought in the market were up to the required standards for fat and non-fatty solids. Several of the sweetened milks, which were to be put on the market for the first time, were incorrectly labelled. The firms were notified of the alterations required. The fresh milk contained no traces of preservative. Of the 50 reconstituted milks analysed, 5 were deficient in fat and one in non-fatty solids. The firm was notified to this effect and further analyses proved satisfactory.

Cream, Butter. These samples, bought in the market, were up to the required fat standard. The butters were free from any preservative.

Soda water etc. These were examined for purity and for contamination with lead or copper. All the samples, including the highly coloured drinks and foodstuffs, were satisfactory.

Flour etc. The samples of flour were collected and analysed as the result of a complaint being received. They were supplied as white roller flour, wholemeal and rye meal. Analysis showed that the wholemeal and rye meal flour had a fibre content of between 2 and 3 per cent. The fibre content of the white flour was negligible. One sample of sago, sent in for indentification, showed no traces of adulteration.

Bean Curds. Two samples were badly " blown " and contaminated with metallic impurities. The other samples were in very much better quality tins and the contents were wholesome. The prohibition of the import of bean curds in tins, which had been in force since 1925, was repealed during the year.

Tinned mutton. This sample was found to be wholesome.

Tinned Sardines. One tin was "blown" and the contents non-edible. The firm was warned.

Tea and tea-dust. These comprised Chinese, Indian and Java teas and five were up to the regulations. Three were low in extract and one of these also had too high an ash content. Steps were taken to find the importers to prevent further supplies being put on the market. The teas in question were not well known brands and probably had very small sales.

Toddy. The sample passed the required standards for alcohol and acid content.

Water from soda fountain. This was contaminated with lead and the vendor was warned.

Pineapple syrup. This sample had been allowed to ferment, the alcohol content being 10.5 per cent by volume.

SAMPLES FROM HEALTH DEPARTMENT.

492 samples of pond and river water, collected from the Sungei Whampoe area, were examined for percentage of sea water.

One medicine, for traces of opium, 4 samples of urine, one calculus and two sugars, for identification, were examined.

SAMPLES FROM ENGINEERING DEPARTMENT.

Analyses of the following substances were reported on:—

Coals (for moisture, ash and C. V.)	61
Coke (for proximate analysis and S.)	3
Granite filler	11
Asphalt	15
Oils ("Mexphalte" and asphalt)	3
Glazed-ware pipes for absorption	3
Paints	2
Water for salinity etc.	37
Boiler water	1

SAMPLES FROM ELECTRICAL DEPARTMENT.

I reported on the following samples:—

Coals for moisture content	116
Coals for moisture, ash and C. V.	130
Boiler water etc.	2
Deposit on furnace arches	3
Deposit on electric cable	1

SAMPLES FROM WATER DEPARTMENT.

The following samples were examined:—

Coals for moisture content	40
Coals for moisture, ash and C. V.	180
Waters for contamination etc.	9
Lime and aluminium sulphate	8
Woodleigh-Kallang waters for special tests	76
Sand	7
Wax	1
Bitumen paints	3
Fuel oil	1
Manure	3

Experiments were also carried out to determine the solvency of copper and lead in our present water supply. The tests showed that the water has a definite solvent action, although it is very small in amount.

SAMPLES FROM GAS DEPARTMENT.

Reports were sent out on the following examinations:—

Spent oxide	16
Coal for proximate analysis and S.	4
Coke for proximate analysis and S.	3

Diesel oil	1
Refined oils from coal tar	2
Turbine oil	2

SAMPLES FROM THE BUILDING SURVEYOR.

A sample of concrete, for cement content, was examined.

SAMPLES FROM C. R. E. J.

These 35 samples consisted of soil taken from the proposed Pontian Pulai pipe line area and were reported on for reaction.

SAMPLES FROM FIRE BRIGADE SUPERINTENDENT.

The composition of the white solid contained in the inner perforated cylinder of the "Auto Electrine" fire extinguisher was reported.

GENERAL.

The branch laboratory at the Alexandra Road sewage works was closed down in May, just prior to the removal of the main laboratory to its new site in Coleman Street.

I took over the duties of Analyst on the 1st January 1929, from Dr. Gilmour, who had been acting during Mr. Harrington's absence on home leave.

I have the honour to be,

Sir,

Your obedient servant,

R. E. WILLGRESS,

A.R.C.S., BSc., A.I.C.,

Municipal Analyst.

TABLE 1.

Analyses of Crude Sewage during 1929.

Parts per 100,000.

	AVERAGE VALUES.				
	Ammonia.		Oxygen in 4 hours.	Suspended Matter.	Chlorine.
	Free.	Alb.			
January ...	3.9	1.0	6.90	39.0	80
February ...	4.3	1.2	6.80	40.0	69
March ...	3.7	.9	6.62	45.0	74
April ...	3.3	.8	6.50	43.0	71
May ...	3.1	.6	5.40	32.0	67
June ...	3.0	.6	5.40	31.0	59
July ...	3.5	.7	5.30	32.0	61
August ...	3.6	.5	5.80	33.3	82
September ...	3.8	.5	6.25	35.0	111
October ...	3.6	.5	6.38	34.0	124
November ...	3.5	.5	6.19	33.2	126
December ...	3.4	.5	6.66	38.9	107
Average ...	3.6	.7	6.18	36.4	86

	RANGES OF VALUE.				
January ...	3.0/4.8	.2/1.6	5.8/9.3	33/48	44/112
February ...	3.0/6.0	.4/1.6	4.5/9.7	33/51	43/102
March ...	2.7/5.0	.6/1.3	5.2/8.3	38/53	42/118
April ...	2.4/5.0	.6/1.2	5.3/7.7	37/53	42/129
May ...	2.5/4.2	.3/ .9	4.7/7.0	26/43	40/129
June ...	2.1/4.0	.3/1.0	4.3/6.8	24/39	33/146
July ...	2.5/4.8	.4/1.0	4.2/6.3	23/46	39/101
August ...	2.4/5.0	.3/1.0	4.7/7.3	26/46	42/248
September ...	2.4/5.4	.2/1.1	4.7/7.8	24/45	47/244
October ...	2.7/4.5	.2/1.2	5.4/8.6	25/59	54/227
November ...	2.4/5.4	.2/1.2	4.3/9.7	23/54	62/211
December ...	2.4/4.5	.2/1.1	4.9/8.2	25/57	49/182
Average ...	2.1/6.0	.2/1.6	4.2/9.7	23/59	33/248

Solids in suspension.

P.H. value – 7.2

Organic Matter in dry solids—76.2%

TABLE 2.

Average Analyses of Effluents from Filter Beds in Blocks A and B.

Parts per 100,000

	Ammonia.		Oxygen in 4 hours.	Suspended Matter.	Chlorine.	Nitrates.
	Free.	Alb.				
			BLOCK A.			
January ...	1.06	.10	.84	2.60	80	1.1
February ...	.95	.12	.88	2.60	65	1.3
March ...	1.28	.11	.87	2.60	76	1.4
April ...	.64	.07	.90	2.60	63	.9
May ...	.60	.08	.90	2.60	54	1.2
June ...	.76	.10	.81	2.70	50	1.0
July ...	.94	.09	.91	2.70	57	.9
August ...	1.07	.10	1.28	3.07	67	1.2
September ...	1.38	.11	1.29	4.05	107	.9
October ...	1.03	.09	1.20	3.82	123	.9
November ...	1.38	.11	1.20	3.97	126	.7
December ...	1.58	.13	1.21	3.40	106	.6
Average ...	1.06	.10	1.02	3.06	81	1.0
			BLOCK B.			
January ...	1.42	.10	.96	2.90	80	1.3
February ...	1.38	.13	1.01	3.00	67	1.2
March ...	1.59	.12	1.24	3.20	74	.7
April ...	1.26	.11	1.23	3.50	60	.3
May ...	.90	.11	.98	2.90	52	1.0
June ...	.76	.08	.90	1.70	54	1.4
July ...	.91	.09	.96	2.90	57	1.3
August ...	1.15	.10	1.36	3.20	68	1.2
September ...	1.27	.10	1.38	4.13	107	1.0
October ...	1.01	.09	1.28	4.46	122	1.2
November ...	1.48	.11	1.23	4.24	126	.7
December ...	1.28	.08	1.21	3.52	106	.8
Average ...	1.20	.10	1.14	3.30	81	1.0

TABLE 3.

Average Analyses of Effluents from Filter Beds in Blocks C and D.

Parts per 100,000.

	Ammonia.		Oxygen in 4 hours.	Suspended Matter.	Chlorine.	Nitrates.
	Free.	Alb.				
	BLOCK C.					
July ...	.89	.14	1.55	4.90	61	.8
August ...	1.12	.10	1.63	4.10	74	.6
September ...	.96	.09	1.34	3.62	106	.8
October ...	.74	.07	1.29	3.41	119	1.1
November ...	.78	.09	1.27	3.75	121	.7
December ...	.90	.10	1.34	3.44	106	.4
Average ...	.90	.10	1.40	3.87	98	.7
	BLOCK D.					
August ...	1.27	.13	1.66	4.03	72	.4
September ...	.95	.08	1.43	3.17	105	.8
October ...	.71	.08	1.34	3.45	117	1.1
November ..	.82	.09	1.27	3.60	120	.7
December ...	.83	.08	1.27	3.55	105	1.1
Average ...	.92	.09	1.39	3.56	104	.8

TABLE 4.

Average Analyses of Humus Tanks' Effluents—flowing into the Alexandra Road stream.

Part per 100,000.

	Ammonia.		Oxygen in 4 hours.	Suspended Matter.	Chlorine.	Nitrates.
	Free.	Alb.				
	FROM BLOCKS A and B.					
January ...	2.30	.37	2.50	9.40	70	.3
February ...	2.23	.33	2.40	9.40	67	.3
March ...	2.54	.34	2.34	9.10	63	.2
April ...	2.12	.25	2.26	8.70	59	.1
May ...	2.10	.24	2.28	8.50	52	.2
June ...	1.74	.22	1.90	6.60	50	.4
July ...	1.53	.16	1.37	4.30	57	.6
August ...	1.80	.14	1.40	3.60	69	.6
September ...	1.42	.11	1.20	3.27	109	.7
October ...	1.21	.11	1.12	2.96	124	.8
November ...	1.31	.09	1.02	3.10	120	.7
December ...	1.31	.11	1.16	3.20	106	.7
Average ...	1.80	.21	1.75	6.01	79	.5
	FROM BLOCKS C and D.					
August ...	1.50	.12	1.40	3.30	74	.6
September ...	1.24	.10	1.24	3.11	110	.8
October ...	.77	.09	1.25	2.87	121	1.1
November ...	.84	.09	1.21	3.10	126	.7
December ...	1.30	.11	1.35	3.48	109	.7
Average ...	1.13	.10	1.29	3.17	108	.8

TABLE 5.

Average Analyses of Effluent from Bio-Aeration Experimental Unit from July to December (inclusive).

Parts per 100,000.

	Ammonia.		Oxygen in 4 hours.	Suspended Matter.	Chlorine.	Nitrates.
	Free.	Alb.				
July ...	2.33	.17	1.19	3.50	57	.2
August ...	2.67	.18	1.40	3.50	70	.2
September ...	2.64	.17	1.22	3.05	113	.2
October ...	2.37	.16	1.31	3.17	122	.2
November ...	2.54	.16	1.14	2.68	126	.2
December ...	2.50	.17	1.30	2.89	104	.2
Average ...	2.51	.17	1.26	3.13	99	.2

QUANTITY OF SEWAGE TREATED IN Bio-Aeration Unit.

	Average Volume per day in gallons.	% returned from Sludge well to Aeration Channel.
July	250,000	—
August	205,000	26.5
September	206,000	11.8
October	204,500	17.0
November	204,200	7.15
December	205,600	11.8

Singapore Municipality

Seventeenth Annual Report

of the

Municipal Bacteriological Laboratory

For the Year

1929

by

COLIN C. B. GILMOUR, M. A., M. B., Ch. B.

Bacteriological Laboratory,

Singapore, 28th January, 1930.

THE MUNICIPAL HEALTH OFFICER.

Sir,

I have the honour to report on the working of this department during the year 1929.

I. PUBLIC HEALTH EXAMINATIONS.

Eleven thousand, one hundred and five examinations were carried out, against 8622 last year.

MALARIA.

Three thousand, seven hundred and twenty nine blood films were received, in 1008 of which malaria parasites were found. The percentage positive was 27.0 per cent,—5 per cent less than last year. There were 324 Subtertian infections, 677 Benign tertian, 2 Quartan, 5 mixed Benign and Subtertian, and 1 mixed Benign and Quartan. Of the positive films 455 came from the Johore Water Works, 14 from Mandai Quarry, 342 from the Health Department, and 197 from Practitioners. There is a reduction of 278 in the number of positive films received from The Health Department and a slight drop (21) in those from practitioners. If it were not for this decrease, in positive films the number is the same as last year.

Mr. Samuels, working in the Laboratory, for the Anti-Mosquito Department, carried out a large number of dissections of trapped anopheline mosquitoes. The number of infected mosquitoes was very small viz. 4 out of 2,455 dissected. The species infected were A. ludlowi 3, A. hyrcanus 1. Typical infected anophelines were received from Mr. B. A. R. Gater, Entomologist, Medical Research Institute, Kuala Lumpur, for comparison. On two occasions batches of anopheline mosquitos were fed on patients known to harbour gametocytes of subtertian malaria, but with negative results. In one case great difficulty was experienced in getting the mosquitoes to feed at all, and in the other, ants, (Keringos), gained access to the cage and destroyed almost all of the fed mosquitoes. The excitement shewn by these ants and the skilful way in which they seized the mosquitoes makes me wonder whether they may not destroy enormous numbers of mosquitoes in nature.

TUBERCULOSIS.

Seven hundred and twenty three specimens of sputum, 10 of faeces, 3 of urine, 3 of pus, 13 of cerebro-spinal fluid, 2 of pathological exudates, 1 of milk and 12 of glands were examined. The My. tuberculosis was demonstrated in 188 sputa, and in 1 specimen of faeces, 1 of pus, and 1 of pathological exudate, and in 7 glands. In the positive faecal specimen and exudate the diagnosis was confirmed by inoculation in guinea pigs. The milk was also tested by inoculation of the centrifuged deposit. The

12 glands were received from the slaughter houses and in 7 of them tubercle bacilli were found microscopically. In 5 cases where no bacilli were found guinea pigs were inoculated with negative results, and in 1 case, to confirm the finding of tubercle bacilli a guinea pig was inoculated and developed typical tuberculosis of spleen, liver, peritoneal, and groin glands. Cultures proved negative but considerable work must still be done. It has been long maintained that tuberculosis of cattle and pigs is unknown in Malaya but that opinion can no longer be held. All these positive cases were in imported animals, but it is likely that, as inspection of slaughtered animals becomes more strict, many more cases will be discovered. The difficulty in establishing cultures points to the bacillus being of the bovine type.

TYPHOID & PARATYPHOID FEVERS.

Seven hundred and forty eight agglutination tests were made. Sixteen specimens of serum gave a positive reaction with the B. typhosus, 2 with the B. paratyphosus A, and 3 with the B. paratyphosus B. Two specimens gave group reactions. Thirteen specimens of blood were examined from 1 of which the Eberthella typhi was isolated in culture. Thirty nine specimens of faeces and three of urine were examined but from none were organisms of the Enteric Group isolated. The total number of positive cases is only one third of last years. A search was made for carriers from one of the schools where cases of typhoid fever had been diagnosed. No typhoid or paratyphoid bacilli were found after precipitation with the specific sera and plating, either direct, or after brilliant green enrichment, but from two cases an organism of the genus proteus was isolated. Serum from the suspected carrier, which failed to agglutinate the typhoid bacillus, agglutinated this proteus organism up to and including dilution 1 in 80, but there was no agglutination with any of the paratyphoid bacilli. The fermentation reactions were characteristic of Proteus valeriae (Boycott).

DYSENTERY.

Amoebic. Seven hundred and seventy one specimens were examined, in 93 of which amoebae or amoebic cysts were found. These were classified as E. histolytica or its cysts 86, E. coli or its cysts 5, Endolimax nana 1, Iodamoeba 1.

Bacillary. Two hundred and one specimens were examined, from 2 of which the B. dysenteriae (Shiga) was isolated. The B. dysenteriae (Flexner) was also isolated from 2, and Hiss & Russell's bacillus from 21. This last bacillus is the common cause of bacillary dysentery in Singapore, and happily does not give rise to such a severe form of the disease as does Shiga's bacillus, though on the other hand it does not react so well to the antidysentery sera available.

CHOLERA.

Ten specimens were received all negative.

PLAGUE.

Twelve specimens were received all negative. One of these came from a case presenting a typical bubo post mortem, but the bacillus recovered from it, though resembling the B. pestis morphologically, was quite different in cultural characteristics and did not give rise to plague on inoculation into guinea pigs. It belonged to the coli group. In another negative case the enlargement of the gland was proved to be due to lymphadenoma. The remainder were ordinary septic conditions.

Rats. Five hundred and seventy nine rats were dissected, and were all free from plague. Four hundred and forty three came from the Port Area, and ships at the wharves, through the Port Health Officer.

The remainder were trapped in the town.

The species and distribution were as follows.

SOURCE.	R. decumanus.		R. rattus.		Concolor.		Mus-culus.	Croci-dure.
	Male.	Female.	Male.	Female.	Male.	Female.		
Port & Ships	25	46	149	217	6	0	0	0
Town .	25	33	32	39	0	3	1	3
	50	79	181	256	6	3	1	3
Total ..	129		437		9		1	3

Though the number of rats is very small the difference in the ratio of decumanus to rattus (1 to 5) in the port series as compared to that in the town is very striking. In past years trapping in the town, we have found decumanus to outnumber rattus by about 10 to 1, whereas in this series, captured in the port, there is only 1 decumanus to 5 rattus. There appears to be a greater variety of colour too in the rattus taken from the port and ships when compared with the uniformly grey—bellied rattus caught in the town. Microfilaria were found in the blood of 1 rattus and trypanosomes in the blood of 14. Routine trapping of rats is being started again in the town area this year.

Fleas. One thousand, two hundred and eighty five fleas were examined and classified, of which 1,279 were X. Cheopis, the remaining 6 being X. astia. The average number of fleas per rat was 2.7 in the port series, 0.8 in the town series, 2.2 over the whole. No ctenocephalus, or ceratophyllus was found.

CEREBRO-SPINAL FEVER.

Eighteen specimens of cerebro-spinal fluid were received in 8 of which the meningococcus was demonstrated.

DIPHTHERIA.

Seven hundred and sixty one specimens were examined from 130 of which the C. diphtheriae was isolated in culture. Nearly all of the positive cultures came from the Middleton Hospital, their virulence being sufficiently attested by the condition of the patients. Three cultures were tested for virulence as to which there was some doubt, including one from a discharging ear. All of these were shown to be virulent, two giving a 4 + reaction on intracutaneous test and the other killing the guinea pig in 5 days. In the month of December instructions were given to the Inspecting Officers to take a throat swab from all children dead under 10 years. The instructions were not given till late in the month so that only 12 swabs were received but of these 1 was positive. To date this year, 5 more have been found, out of 37 swabs received. The isolation in pure culture of the C. diphtheriae from these swabs is a matter of some difficulty, as they naturally are heavily contaminated with putrefactive organisms, and it is only with pure cultures that any determination of virulence can be made. The results so far seem to point to a high degree of infection among children and that this disease is by no means a negligible cause of death.

LEPROSY.

Fifty one specimens were examined in 14 of which the My. leprae was demonstrated.

MISCELLANEOUS.

84	specimens	of urine for general examination
41	„	„ „ causative organisms
21	„	pus „ „ „
5	„	fluid „ „ „
7	„	blood „ „ „
292	„	pus „ gonococci (83 + ve)
17	„	urine „ „ (7 + ve)
2	„	semen „ „ (1 + ve)
1	„	prostatic Fluid „ (1—ve)
1508	„	faeces for ova „ (148 Ankylostome) (288 Ascaris)
3	„	faeces (dog) for ova (1 + ve).
3	„	serum for Trep. pallida (-ve)
1	„	serum for Trep. pertenue (1 + ve).
2	„	sputum for Pneumococi (2 + ve).
4	„	smears for Cl. tetani (-ve).
4	„	semen for spermatozoa (3 + ve).
8	„	blood for Weil Felix reaction (—ve).
5	„	blood for differential count.
14	„	blood (animals) for parasites (—ve).
2	„	faeces for food poisoning (—ve).
1	„	faeces rabbit for coccidiosis (+ ve).
1	„	faeces for fungi (—ve).
1	„	hair for ringworm (+ ve).
1	„	fowl for chicken cholera (—ve).
1	„	urine for leptospira (—ve).
1	„	urine for schistosomiasis (—ve).
5	„	pepper for fly larvae (+ ve).
3	„	tape worms.
2	„	sardines for analysis.
2	„	bean curds for analysis.
1	„	preserved mutton for analysis.
1	„	pineapples for analysis.
5	„	of tumors.
67	„	of milk.
1	„	fleas for (P. irritans)
1	„	faces for blood (—ve)

Salmonella. Eight cultures of organisms belonging to this genus were isolated during the year. Four were isolated from dysenteric stools, three from urines, and 1 from water. In two cases seperated endeavours had been made to establish a diagnosis of Enteric Fever, but agglutination tests were uniformly negative, and cultures from blood, faeces and urine persistently failed to yield the Eberthella typhi. That the organism (a Salmonella Strain 110) was pathogenic in one case was proved by the patients' serum agglutinating it in dilutions up to 1 in 640. In the case of another strain (No. 116) a bacteriophage was present in the patients urine. I failed however to keep up the virulence of this phage and the strain when last examined was free from lysis. All eight strains Nos. 21, 49, 67, 93, 94, 99, 110, 116, gave the sugar reactions characteristic of Salmonella, i.e. they fermented glucose or mannite but failed to ferment lactose, and saccharose. Further fermentation reactions grouped them into 3 groups shewn below.

	21	49	67	93	94	99	110	116
Glucose ...	+	+	+	+	+	+	+	+
Mannite ...	+	+	+	+	+	+	+	+
Xylose ...	+	+	+	+	+	—	+	+
Dulcite ...	—	—	—	—	—	—	+	—
Inosite ...	...	...	...	...	...	...	—	—
Dextrin ...	...	—	—	—	—	—	—	—
Sorbite ...	...	—	...	—	—	...	+	+
Salicin ...	...	—	...	—	...	—	—	—
Levulose ...	...	...	...	...	+	+	...	...
Maltose ...	...	+	...	—	+	—	+	+

Acid and gas = +
No fermentation = —
Not observed = ...

Strains 21, 49, 67, 93, 94 and 116 agree in the reactions characteristic of salmonella suipestifer (Kruse). Lignieres, but vary in action upon Maltose and Sorbite. Strain 110 gives the reactions of Salmonella abortus equi (Meyer and Boerner) while strain 99 in its fermentation reactions is Salmonella pullorum (Rettger.) It has not been possible up to the present to make agglutinating sera for these strains and so determine their relationships as the laboratory stock of rabbits is all required for breeding. None of the cultures were agglutinated by sera for Salmonella schuttmulleri or paratyphi or enteritidis. The isolation of these organisms is of interest as a number of papers have appeared lately describing fevers due to Salmonellae in the tropics. In this connection it is necessary to bear in mind that one of the strains isolated was found in water.

Bacteriophage. Several tubes of bacteriophages for dysentery bacilli were supplied to practitioners and were also used in the Middleton Hospital for treatment of cases who developed dysentery after admission or were admitted with that disease as suspected cases of cholera. The results were good on the whole, and, in one case of laboratory infection by Hiss and Russell's bacillus, where the only treatment was 2 c.c.s. of bacteriophage on the 2nd and 3rd day of illness there was complete recovery in 5 days, and all blood and mucus had disappeared by the 3rd day. There were no cases of cholera during the year so that I had no opportunity of using a bacteriophage in that disease. Twice during the year what appears to be bacteriophage for Pseudomonas aeruginosa (B. pyocyaneus) was isolated. One of the strains was obtained from a specimen of tubercular sputum, the other from a specimen of urine sent for culture. In both cases the "plaques," or cleared areas in the culture, exhibited a peculiar iridescent appearance quite unlike anything seen in phaged cultures of other organisms. This I believe has been observed before but I am unable to trace it in the literature. I have not observed it in cultures of the same organism obtained from sewage. The occurrence of this phenomenon in pseudomonas isolated from tubercular sputum is most interesting when it is remembered that good results have been claimed for the treatment of leprosy by an autolysed culture of pseudomonas and a vaccine of leprosy bacilli—(1).

Milk. Several samples of milk were examined from a dairy where an endeavour is being made to produce clean fresh buffalo milk. The first series analysed was very poor, and it was evident that care had not been taken in sterilization, and there was no difference really, between the milk in an ordinary bottle and that which had been filtered, cooled and placed in "Sterilized" bottles. A second series taken, after the whole process of washing, cleaning, filtering, and sterilizing, had been carefully and intelligently supervised resulted in a milk with only 60,000 colonies per c. c. and a direct count of only 90,000 with faecal organisms in 0.1 c.c. only, the curd being smooth and firm with no holes. A third series taken in the ordinary way showed a very great improvement, on the first there being 55,000 colonies per c.c., a direct microscopic count of 80,000 and lactose fermenters in 0.01 c.c.

The result of straining and cooling the milk and placing it in a sterilized bottle was to reduce the bacterial content from 131,000 to 55,000. When the strained and cooled milk was placed in an ordinary bottle the count rose to 205,000. The strained and cooled milk in a sterilized bottle contained lactose fermenters in 0.01 c.c. while the unstrained milk contained lactose fermenters in 0.00001 c.c. and in unsterilized bottle these faecal organisms increased 10 fold. The production of clean milk here is still in an experimental stage but it does seem to be possible, once the dairy keepers understand what is meant by dirt, what principles underlie sterilization, and develop an "aseptic conscience." One attendant in his eagerness to demonstrate the cleanly condition of the pipes after sterilizing, wiped them out with his fingers. On the other hand there is a tendency to think that steam and heat do everything and that dried stale milk is of no consequence. Forty four samples of reconstituted milk were examined the object being to maintain the product at a standard equal to "Grade A Pasteurized" Milk viz. no coliform bacillus in 0.01 c.c. and a total count of not more than 30,000 bacteria per c.c. That standard was maintained on the whole during the year.

Tumors. An interesting specimen was submitted by the Municipal Veterinary Surgeon where the peritoneum of an ox was covered with grape like bodies. These were thought to be Tubercular at first but on section were found to be carcinomatous. This is the second case of schirrous carcinomatosis of the ox I have seen in Singapore. The first occurred some years ago and was diagnosed by Dr. Finlayson. In that case the tumors could be pinched off and left a pockmarked surface, and it was evident from the surface that many must have fallen off during life.

II. WATER.

Eight thousand seven hundred and sixty eight samples of water were examined during the year of which 8743 were routine samples of Municipal Water, including samples from the water works in Johore. The water from Sultan Ibrahim Reservoir entered Pearls Hill at the very end of the year. Before allowing it to enter samples were taken at various points for several days and the quality is checked daily by a sample taken at the Venturi House, Pearls Hill.

(a) TOTAL COUNTS.

The average number of colonies per c.c. developing on agar at 37° C was.

TABLE I.

Sultan Ibrahim Valve Tower	196
Sultan Ibrahim Inlet Filter	110
Sultan Ibrahim Outlet Filter	84
Seletar Reservoir	234
Pierce Reservoir	77
Mac. Ritchie Reservoir	80
Bukit Timah Raw Water	184
Woodleigh Raw Water	96
Pearls Hill No. 1	92
Pearls Hill No. 2	97
Fort Canning Reservoir	112
Tap water	80

These results are very good and almost the same as last years, except in the Johore series, which has improved, as was to be expected. Samples taken in rotation from the streams in the catchment areas proved free from gross recent contamination.

(b) LACTOSE FERMENTERS.

The quality of the tap water was kept at a very high level bacteriologically throughout the year. The samples were obtained daily from several taps in the town and the results closely agreed. In 74.3 per cent of the samples there was no B. coli in 100 c.c.s., and in only 0.3 per cent was it present in 1 c.c. It can be maintained that the town supply is free from undesirable contamination and can be used as delivered without fear of infection by water borne disease. Table 2 summarizes and averages the results obtained from the chief points of the water system during the year. The effluent from the various filters was tested daily and was satisfactory as may be gathered from the results of examination of tap water.

TABLE II.

SOURCE.	Lactose Fermenters present in.					
	—100	+100	+10	+1	+0.1	+0.01
Sultan Ibrahim Valve Tower	18.6	81.4	35.6	5.1	—	—
„ „ Inlet Filter	30.9	60.1	20.6	7.2	1.0	—
„ „ Outlet „	52.2	47.8	13.0	1.0	—	—
Seletar Valve Tower ...	12.1	87.9	41.4	10.8	2.2	—
Pierce Valve Tower ...	8.2	91.8	31.9	5.2	—	—
Mc. Ritchie Valve Tower ...	15.1	84.9	50.4	8.6	—	—
Bukit Timah Raw Water ...	2.2	97.8	57.8	14.3	1.3	—
Woodleigh „ „ ...	22.2	77.8	19.2	2.2	—	—
Pearls Hill No. 1 ...	45.7	54.3	14.6	3.4	—	—
„ „ No. 2 ...	43.1	56.9	13.4	1.3	—	—
Fort Canning ...	71.5	28.5	6.2	0.5	—	—
Tap ...	74.3	25.7	1.9	0.3	—	—

On several occasions as last year, nitrites appeared in the effluent from some of the filters at Woodleigh, though the bacteriological results, at the time, were excellent. In some of the filter beds the amount was considerable though there was no question that all sewage contamination was absent. An experiment done in September seemed to shew that a water containing nitrites would be a better culture medium than one without nitrites. A sample from Beds, from which nitrites were absent, was inoculated with a suspension of faecal organisms, and the total counts compared with those from a sample from Bed 6, treated in a similar manner. The rsults were:

Date	Filter 5	Filter 6
	No nitrites	Nitrites present ..
20th	1038	1124
23rd	2136	14712
24th	348	3744

The matter might be worth following up but the whole object of a piped supply is to ensure freedom from accidental contamination.

(c) ISOLATION OF B. COLI.

Less work was done on this subject than in previous years, as colonies were only isolated, and studied when there was a suspicion of faecal contamination being present in the sample. Only 70 colonies from the lactose fermenting tubes were isolated as against 280 last year. and the proportion of organisms of the susceptible group is higher viz. 10 out of 70 while last year it was only 10 out of 280. As last years colonies were taken from a routine isolation once a week as well as from all suspicious samples it would seem that the amount of contamination, very small, is constant.

As in last year's report I have arranged the colonies in Clemeshas classes of susceptibility and also give their formulae with Sod. Citrate Voges Proskaver, and Methyl Red reactions.

SOURCE.	Class.				Formula.						Group.			
	I	II	III	IV	1	2	3	4	5	6	1	2	3	4
G. Pulai Inlet ...	4	1	3	2	8	1	—	—	1	—	3	4	1	2
Kallang Conduit ...	—	5	1	4	1	4	3	—	—	2	3	—	1	6
Stream 13. Mc. Ritchie ...	3	1	—	1	4	1	—	—	—	—	—	3	—	2
Stream 1. Mc. Ritchie ...	—	—	—	5	2	—	3	—	—	—	5	—	—	—
Woodleigh Filter 9 ...	—	—	2	3	—	2	1	—	2	—	1	—	—	4
Bukit Timah 16 ...	—	—	5	—	5	—	—	—	—	—	5	—	—	—
,, ,, 13 ...	—	—	4	1	3	1	1	—	—	—	1	—	1	3
,, ,, 11 ...	2	1	2	—	5	—	—	—	—	—	2	2	1	—
,, ,, C.W.T.	—	2	3	—	2	2	1	—	—	—	2	—	1	2
Fort Canning ...	1	—	4	—	4	—	—	—	1	—	3	1	—	1
Tap ...	—	7	2	1	—	2	3	—	5	—	—	—	5	5
Total ...	10	17	26	17	34	13	12	—	9	2	25	10	10	25

Organisms of the susceptible class (Class I) were found only in the Inlet at Gunong Pulai, stream 13 at McRitchie Reservoir, Filter 11 at Bukit Timah Filter Beds, and in a sample from Fort Canning Reservoir. It is probable that the last was due to bad sampling.

The organisms giving formula 1 i.e. "the truly faecal" formula in Sod. Citrate, Methyl Red, and Vages Proskauer reaction were.

Escherichia coli	10
,, paragruntal	18
,, pseudocoscoroba	2
,, neapolitana	2
Unclassed	3

MISCELLANEOUS WATERS.

Twenty two samples of Chlorinated Water from Mandai Quarry were c.c.s., and the total number of colonies averaged only 42 per c.c. analysed. On only 1 occasion were presumptive B. coli present in 100

Samples from Labuan and a Rubber Estate were also analysed. In connection with the proposed use of Mount Emily reservoir as a public swimming bath some analyses were made of the water in the Salt water tank at Fort Canning. This tank is used as a swimming pool by the Y. M. C. A. and it was thought that some useful information as to the extent and persistence of pollution might be obtained. Recently great attention has been paid to the bacteriology of Public Swimming Pools and they have been blamed as causing disease even leading to death. As this salt water is taken from the harbour it was expected that there would be strong bacteriological evidence of pollution. It was found however that the water in the pool was surprisingly free from evidence of recent sewage contamination and that there was a progressive improvement in the water as it reached the pool. It is probable that this is due to the effect of sun and air which have a great influence in naturally purifying surface and lake waters in the tropics as has been so well proved by Clemesha.

The following tables shew the results obtained.

Month	SOURCE	Total Count	"B. coli" present in.							
			— 100	+ 100	+ 10	+ 1.0	+ 0.1	+ 0.01	+ .001	+ .0001
October	Pump House ..	—	—	—	—	—	—	—	—	—
,,	Town Tank ..	—	—	—	—	—	—	—	—	—
	Swimming Pool ..	692	100	—	—	—	—	—	—	—
November	Pump House ..	1,441	—	100	100	100	100	50	—	—
,,	Town Tank ..	763	15.8	84.2	73.6	68.3	26.2	—	—	—
,,	Swimming Pool ..	724	42.1	57.9	42.1	10.6	5.3	—	—	—
December	Pump House ..	5544	—	100	100	94.1	88.2	71.6	48.1	—
,,	Town Tank ..	437	11.1	88.9	88.9	83.3	38.9	5.6	—	—
,,	Swimming Pool ..	461	22.2	77.8	77.8	50.0	5.6	5.6	—	—

From this it will be seen what a great improvement occurs in the water between its arrival in the Pump House and the final condition in the pool. It would not be safe however to argue that the same results would follow in fresh water used as a public bathing pool where the number of bathers would be much larger and perhaps under less supervision.

III. SEWAGE.

Bioaeration Unit. Microscopic examination of the activated sludge was carried out almost daily, and numerous photographs were taken, in an endeavour to discover whether marked alterations in the purification effected, or in the physical characteristics of the sludge, could be related to a particular type of microscopic picture.

Roughly five types of sludge can be recognized microscopically viz.

1. Particles consisting of pure bacterial filaments. This type was not seen during the year.
2. Particles consisting of filaments more or less tangled and clothed with amorphous matter and bacteria.
3. Loose bulky filamentous particles.
4. Particles in a rolled formation more or less dense.
5. Dense irregular closely packed particles forming compact flakes. All but 1 may be accompanied by colonies of vorticellae and allied ciliates.

The running of the unit during the year can be divided into two phases. During phase 1 which lasted from February to 31st July the running was irregular, the purification was variable and "Bulking" was frequent. In February, March and April type 2 persisted and though the purification was good, the oxygen absorbed varying from 0.94 to 1.02 in March and April, and the suspended matter from 2.3 to 3.0, the sludge bulked badly, so that in May and June it had to be reconditioned. During May and June type 3 persisted.

Phase 2 started in July and the unit has treated sewage at the rate of from 200,000 gallons to 250,000 gallons a day until the end of the year. For the first half of July there was little bulking and a sparkling effluent was obtained but the sludge bulked badly in the second half of the month and was evil smelling. During the first period the photographs shew types 4 and 5, during the second period types 3 and 2. Type 2 persisted also during the first two weeks of August during which time the oxygen absorbed was about 2.28 parts and suspended matter 5.9. During the second part of the month types 4 and 5 appeared and persisted up to the end of October. While this type persisted the purification effected was good. The absorbed oxygen varied from 0.78 to 1.59 and suspended matter from 2.25-4.40. During November types 4 and 5 were present. These types are accompanied by varying amounts of protozoal life particularly vorticella forms, often in enormous colonies, and these cilates have been numerous throughout the whole of the 2nd phase. The most interesting feature of the microscopy of the activated sludge during the year, was the enormous growth of spirillae which took place in August 26th and continued until the end of October, so that many of the slides looked like pure cultures of spirillae mingled with protozoa giving a very beautiful appearance under dark ground illumination with low powers. At this time also there was increased growth of Beggiatoa. At one time I connected these phenomena with poor working but during their persistence this year the unit worked better than it has ever done before. I am indebted to the Analyst Mr. Willgress for the figures of absorbed oxygen (at the end of 4 hours) and suspended matter.

Sludge. Samples of dried sludge from the Imhoff tanks, Bioaeration Unit and Humus tanks were frequently examined for the larvae of nematodes. They were found in the sludge from the Imhoff tank on every occasion but only once in the bioaeration sludge and humus sludge. hook worm eggs, a clonorchis egg, and numerous ascaris eggs have been found in the Bioaeration Sludge.

Conservancy. Samples of water in which nightsoil pails had been washed at the pumping stations were examined, with a view to ascertaining whether disinfectants were being properly used or not. The results proved that neither antisepsis or disinfection was being obtained. Further samples are to be tested.

Middleton Hospital. The sewage here after settlement is treated by chlorination and a sample of the effluent was tested weekly. The examination was confined to estimation of faecal organisms and total colonies. Complete sterilization was not obtained but remarkably low counts were frequently found and on several occasions faecal organisms were not present in less than 10 c.c.s. The interesting point is the rhythmic rise and fall in the counts. The peak occurs approximately every 5 weeks, and is evidently due to the exhaustion of the chlorine cylinder. The curve of faecal organisms too does not always follow that of total colonies but appears to follow a secondary rhythm of its own. As the sewage chlorinated is not all derived from the Middleton Hospital but includes the effluent from Tan Tock Seng Hospital the results will vary with the working of the septic tank there.

The highest count obtained was 15,500 per c.c., the lowest 350.

IV. MORTUARY.

Only 5 post mortem examinations were made during the year. The causes of death were.

Bubonic Plaugue	1.
Pulmonary Congestion & Cardiac Failure	1.
Cardiac Failure	1.
Syphilis & Chronic Malaria	1.
Diphtheria	1.

V. GENERAL.

I have again to record my thanks to Mr. Chin Chin Fong, Mr. Loo Cheng Swee, and Mr. Lim Toh Nee for their good work and keen interest in everything pertaining to the department during the year.

The laboratory was moved into the new offices on 14th May. The extra space available, as compared with the old offices, allows every member of the staff a working place for himself and this has resulted in more and better work. A curious result of the move is that, now that the animals are housed on the roof, we have had no difficulty in keeping up our supply by breeding on the premises and have had practically no mortality among the young ones.

I have the honour to be,

Sir,

Your obedient servant,

COLIN C. B. GILMOUR, M.A., M.B., Ch.B.

Municipal Bacteriologist.

Middleton Hospital,
Singapore, 13th January, 1930.

The Municipal Health Officer.

Sir,

I have the honour to present the annual report of the Middleton Hospital for the year 1929.

The following table summarises the cases treated during the year.

DISEASE	Remaining from 1928	Admitted	Discharged	Died	Remaining
Smallpox	—	9	7	2	—
Cholera	—	—	—	—	—
Plague	—	—	—	—	—
Chickenpox	21	553	567	—	7
Measles	7	42	45	1	3
Diphtheria	—	38	22	15	1
Cerebro-Spinal Fever ..	1	3	1	3	—
Erysipelas	—	1	1	—	—
Whooping Cough	—	1	1	—	—
Mumps	1	66	64	—	3
Under observation (contacts)	—	17	16	—	1
German Measles	—	6	6	—	—
Scarlet Fever	—	6	6	—	—
Tuberculosis	—	1	1	—	—
Other Diseases	—	63	59	4	—
Total ..	30	806	796	25	15

The number of admissions during the year, 806, was the highest on record, yet there was no serious epidemic infectious disease. There were only 9 cases of smallpox, none of cholera and plague, and only 3 admissions for cerebro spinal fever. The most common diseases were chickenpox, measles, mumps, and diphtheria.

1. **Smallpox.**—Of the 9 cases treated 2 died. Four cases were traced direct to Chinese ports and the rest apparently contracted the disease in Singapore. Four cases were confluent, three of whom were not vaccinated. The remainder were discrete and had been vaccinated. The distribution by nationality was European 3, Eurasian 1, Chinese 5. Two of the Europeans were ships officers.

2. **Diphtheria.**—This was the most serious disease treated. Thirty eight cases were admitted of whom 15 died. Nineteen of the admissions (50 per cent) were laryngeal of whom 10 required immediate tracheotomy and 7 died, 4 within an hour of operation. In all the fatal cases a history of illness of from 5 to 14 days was given and it is difficult to understand how children could be allowed to get into the condition some of them were in without its being apparent that they were desperately ill. Nasal diphtheria was common and in one case these were numerous ulcers from which the Corynebacterium diphtheriae was isolated. In another case it was isolated in pure culture from a running ear, and proved to be very virulent. There must be very many cases of diphtheria here unrecognized, to have given rise to 19 laryngeal cases in the practice of the hospital in one year.

3. **Scarlet Fever.**—Six cases were admitted all in Europeans. one case came from H.M.T. "Somersetshire" and the remainder were children from Tanglin Barracks. The cases were all mild, but all showed the typical desquamation, and tongue.

4. **Chickenpox.**—This accounted for 553 admissions of whom 464 were adult Tamils nearly all our own coolies.

5. **Other Diseases.**—Sixty three persons admitted as having one or other of the notifiable infectious diseases were found to have other diseases. Four of them died the causes of death being Tetanus 2, Dysentery 1, Syphilis 1.

The remainder were discharged or transferred to other hospitals. Septic skin conditions and syphilis accounted for twenty five per cent of these admissions. Among these cases was one of Tsutsugamushi disease, this being the second case known to have been contracted locally.

The Nationalities treated were.

Europeans	..	24	465 days.
Eurasians	..	23	361 „
Japanese	..	8	146 „
Jews	..	1	2 „
Chinese	..	136	2067 „
Indians	..	589	7819 „
Malays	..	25	252 „

The total number of days spent in Hospital was 11,112.

The following table shews the admissions to the Hospital during the past 10 years.

DISEASE	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Cholera ..	8	—	—	—	—	—	16	20	4	—
Smallpox ..	3	139	248	2	8	9	30	16	8	9
Plague ..	30	16	20	29	11	21	1	2	3	—
Chickenpox ..	30	98	103	172	210	277	155	180	324	553
Diphtheria ..	15	20	13	18	17	32	25	16	42	38
Cerebro-Spinal Fever ..	27	57	29	6	13	7	6	14	13	3
Influenza ..	14	5	1	—	—	—	—	—	—	—
Measles ..	—	39	23	20	29	49	70	69	94	42
Erysipelas ..	—	9	3	8	5	2	11	3	6	1
Mumps ..	—	25	—	6	—	27	47	79	48	66
Whooping Cough ..	—	1	—	1	—	1	6	4	8	1
Typhoid Fever ..	—	1	—	1	—	1	3	1	—	—
Tuberculosis ..	—	5	4	2	—	1	1	—	1	1
German Measles ..	—	—	1	—	21	7	3	18	7	6
Scarlet Fever ..	—	—	1	—	—	—	1	—	3	6
Contacts ..	—	—	—	—	—	19	18	42	45	17
Typhus Fever ..	—	—	—	—	—	—	—	—	1	—
Puerperal Fever ..	—	—	—	—	—	—	—	1	—	—
Other Diseases ..	46	61	58	15	41	17	32	52	63	63
TOTAL ..	182	476	504	282	361	473	425	517	670	806

The Students from the Medical College attended for clinical instruction in infectious diseases.

I have the honour to be,

Sir,

Your obedient Servant,

C. C. B. GILMOUR, M.A., M.B.,

Medical Superintendent.

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1929.

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
16/3/29	Kassi Guala	145, Syed Alwi Road	P. C. 974	Selling milk without a licence	Mr. W. Wilson	Fined $ 20.00	
,,	Balasair Guala	81, ,, ,,	,, ,,	Do.	,,	,, 20.00	
20/4/29	Chung Chwee	59, Duxton Road	,, 1013 Accompanied Insp: Quays	Not attending Court in answer to a summons repreparing and selling human food without first obtaining a licence.	3rd Magste.	,, 3.50	
11/6/29	Rengalingam Pillay	... ...	P. C. 629	Selling milk without licence	4th Court	,, 20.00	
,,	Ganghi Singh	... ...	,, 529	Do.	2nd ,,	,, 20.00	
27/6/29	Ramnath	... ...	,, 1009	Do.	,, ,,	,, 5.00	
12/6/29	Lochan Singh	... ...	,, 1005	Do.	,, ,,	,, 18.00	
,,	Bisunarth	... ...	,, 1322	Do.	,, ,,	,, 15.00	
14/6/29	Toolsee	... ...	,, 1084	Do.	,, ,,	,, 10.00	
21/6/29	Sereneh Singh	... ...	,, 782	Do.	4th Court	,, 20.00	
,,	Naris Guala	... ...	,, ,,	Do.	,, ,,	,, 20.00	
,,	Basdeo Singh	... ...	,, 514	Do.	2nd ,,	,, 7.00	
				Carried	*Forward* ...	$178.50	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1929.—contd.

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
				Brought	*Forward* ...	$178.50	
13/6/29	Subadar Singh ...	13, Cuff Road ...	P. C. 18	Selling milk without licence	4th Court	Fined 20.00	
27/6/29	Surfrage Singh ...	77, Dunlop Street ...	„ 797	Do.	2nd „	„ 5.00	
„	Rajoo Koney ...	339, Serangoon Road ...	„ 1009	Do.	„ „	„ ...	With-drawn (Licence)
13/6/29	Baychew ...	30, Dunlop Street ...	„ 1459	Do.	4th „	„ ...	do.
27/6/29	Angrayit ...	Potong Pasir, off Serangoon Road ...	Insp: Maniam	Do.	2nd „	„ 7.00	
20/6/29	Diepandia ...	38, Mac. Pherson Road	P. C. 226	Do.	4th „	„ 20.00	
„	Kedar Pandy ...	30, Dunlop Street ...	„ 858	Do.	„ „	„ 20.00	
22/6/29	Halirland Singh ...	... ...	Insp: Mitra	Do.	2nd „	„ 7.00	
20/6/29	Kishore Singh ...	12, Desker Road ...	Insp: Mitra	Failing to carry licence	2nd „	„ 2.00	
21/6/29	Jadanath Aliss Bayoo ...	48, Mac. Pherson Road	P. C. 864	Selling milk without licence	4th „	„ 15.00	
21/6/29	Sudathan Singh ...	386, Changi Road ...	„ 1172	Failing to carry licence ...	„ „	„ 1.00	
27/6/29	Supdeo Guala ...	Unknown ...	„ 682	Selling milk without licence	„ „	„ 20.00	
„	Dhalkesin ...	79, Dunlop Street ...	„ 564	Do.	2nd „	„ 15.00	
				Carried	*Forward* ...	$310.50	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1929.—contd.

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
				Brought	*Forward* ...	$310.50	
11/6/29	Mutra Singh	...Syed Alwee Road ...	P. C. 1040	Selling milk without licence	4th Court	Fined 20.00	
13/6/29	Banipara	...Dunlop Street ...	,, 982	Do.	2nd ,,	,, 10.00	
20/6/29	Kajaram	...Syed Alwee Road ...	,, 586	Do.	,, ,,	,, 20.00	
13/6/29	Kameas Singh	...Desker Road ...	,, 982	Do.	,, ,,	,, 5.00	
,,	Asswan Singh	...13, Lavender Street ...	Insp: Quays	Do.	4th ,,	,, 20.00	
20/6/29	Rangoo Guala	...Kampong Batak ...	P. C. 368	Do.	2nd ,,	,, 12.00	
12/6/29	Karapiah	...Holland Road ...	,, 489	Do.	4th ,,	,, 5.00	
,,	Bini Paray	...Dunlop Street ...	,, 523	Do.	2nd ,,	,, 20.00	
21/6/29	Mongal Singh	... ,, ,, ...	,, 1360	Failing to carry his licence	4th ,,	,, 2.00	
12/6/29	Jaganath Singh	...13, Cuff Road ...	Insp: E. E. de Souza	Selling milk without a licence	,, ,,	,, 20.00	
,,	Ansooran Singh	...13, Lavender Street ...	,,	Do.	,, ,,	,, 20.00	
22/6/29	Sookaree Singh	...114, Syed Alwee Road ...	,,	Do.	2nd ,,	,, 7.00	
11/7/29	Balai Ram	...145, Syed Alwee Road ...	P. C. 994	Do.	,, ,,	,, 5.00	
,,	Dootoonath Singh	...80, Dunlop Street ...	,, ,,	Do.	,, ,,	,, 5.00	
				Carried	*Forward* ...	$481.50	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1929.—contd.

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
				Brought	*Forward* ...	$481.50	
11/7/29	Pakerie ...	St. Michaels Road ...	Charged at K. K. Police Station P. C. 676	Selling milk without a licence	2nd Court	Fined 10.00	
18/7/29	Sikaran ...	... ...		Do.	,, ,,	,, 10.00	
,,	Bisunath ...	... ...	,, 1074	Do.	,, ,,	,, 10.00	
24/7/29	Perewah ...	... ...	,, 1294	Do.	4th ,,	,, 20.00	
11/7/29	Sitdaram Singh ...	... ...	,, 994	Do.	2nd ,,	,, 5.00	
,,	Motura Ram ...	... ...	,, ,,	Do.	,, ,,	,, 12.00	
12/7/29	Loong Hing ...	45, Sago Lane ...	,, 887	Failing to appear in answer to a summons ...	3rd ,,	,, 5.00	
19/7/29	Jalkomi Singh ...	... ...	,, 491	Selling milk without a licence	2nd ,,	,, 10.00	
12/7/29	Chong Ngam ...	45, Sago Lane ...	,, 1176	Failing to appear in answer to a summons ...	3rd ,,	,, 5.00	
19/7/29	Ramasamy ...	... ...	,, 200	Selling milk without a licence	2nd ,,	,, 10.00	
25/7/29	Esardat Rai ...	... ...	,, 1525	Do.	4th ,,	,, 20.00	
19/7/29	Raj Mangal ...	Thompson Depot ...	Insp: E. E. de Souza	Do.	2nd ,,	,, 10.00	
11/7/29	Pursatang Singh ...	... ...	P. C. 994	Do.	2nd ,,	,, 15.00	
				Carried	*Forward* ...	$623.50	

MUNICIPAL HEALTH OFFICE.

Return of Arrest Cases during the Year 1929.—contd.

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
				Brought	*Forward* ...	$623.50	
11/7/29	Ranghi ...	... ...	P. C. 1390	Selling milk without licence	2nd Court	Fined 15.00	
„	Bulah ...	... ...	„ „	Do.	„ „	„ 12.00	
18/7/29	Hajari Guala ...	Syed Alwi Road ...	Insp: Lee Kwong Soon	Do.	4th „	Discharged	
„	Ram Rattan Guala ...	3½ Mile, Serangoon ...	„	Do.	2nd „	Fined 10.00	
„	Govindasamy ...	Holland Road ...	„	Do.	„ „	„ 10.00	
9/8/29	Jahangura Rai ...	... ...	P. C. 3065	Do.	4th „	„ 15.00	
„	Haruam Singh ...	... ...	„ 1155	Do.	2nd „	„ 5.00	
„	Jaga Singh ...	... ...	„ „	Do.	„ „	„ 1.00	
29/8/29	Beesoonath Rai ...	... ...	„ 1301	Do.	4th Court	„ 20.00	
„	Dootoonath Singh ...	... ...	„ „	Do.	„ „	„ 2.00	
29/8/29	Ramnah Singh ...	... ...	„ 1017	Do.	„ „	„ 3.00	
8/8/29	Phose Dal ...	... ...	„ 1971	Do.	2nd „	„ 5.00	
28/8/29	Lalsamy Singh ...	79, Dunlop Street ...	„ 564	Do.	„ „	„ 5.00	
29/8/29	Kilanaram ...	81, Syed Alwi Road ...	Insp. E. E. de Souza	Do.	„ „	„ 20.00	
				Carried	*Forward* ...	$746.50	

Date.	Name.	Address.	By whom Arrested.	Offence.	By whom Tried.	Results.	Remarks.
				Brought	*Forward* ...	$746.50	
30/8/29	Leng Soo Khiang, "The Secretary of the Khek Committee Guild" ...	72-A, Peck Seah Street	P. C. 1087	Not appearing in Court in answer to a summons Under Section 212 ...	Magste. Findlay		Costs—Notice complied with on 28/8/28.
31/8/29	Bisunath Singh ...	78, Dunlop Street ...	" 1373	Selling milk without a licence	2nd Court	Fined 5.00	
"	Govindasamy ...	5th Mile, Holland Road	" 669	Do.	" "	" 5.00	
3/8/29	Nar Singh Missi ...	... ...	" 1384	Do.	" "	" 4.00	
"	Baijos ...	... ...	" 1491	Do.	" "		With-drawn Licence produced in Court.
2/9/29	Adjutia Singh ...	237, Serangoon Road ...	" 564	Unlicensed Milk Vendor ...	" "		With-drawn.
"	Varshotan ...	Joo Chiat Road ...	" "	Do.	" "	" 15.00	
"	Sanpani ...	Frankel's Estate ...	" "	Do.	" "	" 5.00	
25/9/29	Boola Ram ...	57, Serangoon Road ...	" 782	Do.	4th "	" 12.00	
17/10/29	Moolai ...	Syed Alwi Road ...	" 1275	Do.	2nd "	" 10.00	
21/10/29	Paltoo ...	Dunlop Street ...	" 486	Do.	4th "	" 10.00	
29/11/29	Koh Ah Mee ...	2, Muar Road ...	" 664	Unlicensed Eating-House ...	3rd "	" 25.00 and cost	
						$837.50	

H. J. BENJAFIELD,
Chief Sanitary Inspector.

RETURN OF LICENCES (OFFENSIVE TRADES) ISSUED DURING THE YEAR 1929.

Nature of Licence.	Number issued.	Amount $ cts.	REMARKS.
Blachan Store ...	10	240 ...	
Brick Kiln ...	...	... ...	
Dye House ...	9	102 ...	
Drying and Sorting Fish ...	5	60 ...	
Fish Curing ...	...	... ...	
Fruit Preserving ...	5	250 ...	
Knacker's Yard ...	1	12 ...	
Lime Making ...	...	... ...	
Lye Making ...	...	... ...	
Laundry ...	350	350 ...	
Offal Boiling ...	...	... ...	
Pottery Works ...	...	... ...	
Private Market ...	...	... ...	
Rags and Bones Store ...	1	6 ...	
Sago Factory ...	4	200 ...	
Sheep or Goat Pens ...	2	24 ...	
Sugar Boiling ...	9	450 ...	
Soap Boiling ...	14	220 ...	
Tannery ...	11	465 ...	
Cowsheds ...	4	93 ...	
Cattle Sheds ...	25	666 ...	
Pony Stables ...	6	33 ...	
Piggery ...	...	... ...	
	456	3,171 ...	

H. J. BENJAFIELD,
Chief Sanitary Inspector.

Return of Notices Served and complied with etc., during the Year, 1929.

NATURE OF NOTICE.	Brought forward from last year.	Served during the year.	Total.	Complied with during the year.	Carried forward to next year.	REMARKS.
Nuisance Notices	34	74	108	80	10	(18 Cancelled)
Intimation Notices	78	857	935	721	128	(86 ,,)
Limewash Notices	329	3,002	3,331	3,219	102	(10 ,,)
Drain Notices	...	4	4	3	1	... ...
Demolition Notices	...	7	7	3	2	(2 ,,)
Destruction of Mosquitoes	262	661	923	735	186	(2 ,,)
Well Notices	11	26	37	26	1	(10 ,,)
Latrine Notices	1	6	7	5	...	(2 ,,)
Mandatory Orders	1	4	5	5	...	... ...
Abatement Orders	1	...	1	1	...	... ...
Closing Orders	28	26	54	54	...	... ...
Ejectment Orders	...	8	8	8	...	... ...
Total ...	745	4,675	5,420	4,860	430	(130 Cancelled)

H. J. BENJAFIELD,
Chief Sanitary Inspector.

HEALTH DEPARTMENT.

Return of Prosecutions for Year ending 31st December, 1929.

OFFENCES.		Division A. (South) Districts.				Division B. (North) Districts.			
		TOTAL.				TOTAL.			
		Prosecutions	Withdrawn	Convictions	Fines	Prosecutions	Withdrawn	Convictions	Fines
					$ cts.				$ cts.
Municipal Ordinance 135.									
Obstructions	Section 116	...	...	...	...	...	...	...	...
Offensive matter flowing into Public Drain ...	,, 127	...	...	...	...	1	...	1	10.00
Establishing a private market	,, 191	1	...	1	50.00	...	...	...	...
Unlicensed Offensive Trades	,, 204	37	4	33	385.00	61	16	45	371.00
Using nightsoil/or urine as manure	,, 206	1	1	...	...	29	2	27	135.00
Latrine etc. notice not compied with	,, 212	...	...	...	...	2	...	2	...
Nightsoil kept for more than 48 hours ...	,, 216	2	...	2	29.00	...	...	...	...
Filthy premises	,, 226	152	10	142	1,041.00	177	14	163	904.50
Limewash notice not complied with	,, 227	...	...	...	...	2	...	2	...
Non-compliance of notice for the destruction of rats and mice	,, 228	...	...	...	...	...	...	...	...
Non-compliance of notice of demolition order of insanitary dwelling	,, 229	3	...	3	...	...	...	...	...
Carried Forward ...		196	15	181	1,505.00	272	32	240	1,420.50

HEALTH DEPARTMENT.

Return of Prosecutions for Year ending 31st December, 1929.—Contd.

OFFENCES.		Division A. (South) Districts.				Division B. (North) Districts.			
		TOTAL.				TOTAL.			
		Prosecutions	Withdrawn	Convictions	Fines	Prosecutions	Withdrawn	Convictions	Fines
					$ cts.				$ cts.
Brought Forward	...	196	15	181	1,505.00	272	32	240	1,420.50
Allowing premises to be overcrowded ...	„ 230	...	...	...	...	1	...	1	30.00
Non-compliance with Nuisance Notice ...	„ 239	3	...	3	10.00	3	...	3	34.00
„ „ „ Order ...	„ 240	3	3	...	...	...	...	...	...
„ „ Closing Order ...	„ 240	...	...	...	...	...	...	...	...
Non-compliance of order for demolition of house unfit for human habitation ...	„ 241	18	10	8	...	...	...	...	...
Non-compliance with Well Notice	„ 247	...	...	...	...	...	...	...	...
Opening Well without permission	„ 247	4	1	3	...	2	2	...	...
License not exhibited	„ 371	...	...	...	...	...	...	...	...
Failing to appear in answer to a summons	...	3	1	2	10.00	...	...	...	...
Byelaws-Sections 57 & 204 M. O. 135.									
Unlicensed Foodshops	...	956	215	741	3,245.50	838	212	626	2,868.45
Carried Forward	...	1,183	245	938	4,770.50	1,116	246	870	4,352.95

HEALTH DEPARTMENT.

Return of Prosecutions for Year ending 31st December, 1929.—Contd.

OFFENCES.	Division A. (South) Districts.				Division B. (North) Districts.			
	TOTAL.				TOTAL.			
	Prosecutions	Withdrawn	Convictions	Fines	Prosecutions	Withdrawn	Convictions	Fines
				$ cts.				$ cts.
Brought Forward ...	1,183	245	938	4,770.50	1,116	246	870	4,352.95
Unlicensed Milk Vendors	47	2	45	538.00	25	2	23	228.00
Recovery of Daily fines	142	70	72	1,652.00	38	9	29	451.00
Employing women without permission of H. O.	...	...	...	...	...	...	...	...
Breaches of the Piggery Byelaws	...	...	...	...	...	...	...	...
Unlicensed Piggeries	186	11	175	728.50	73	8	65	288.50
Filthy Stables, Cowsheds, etc.	...	...	...	...	...	...	...	...
Breaches of the Foodshop Bylaws	44	2	42	192.50	42	5	37	216.00
Failing to carry Milk Sellers licence	1	...	1	1.00	2	...	2	2.00
Markets and Slaughter Houses.								
Selling vegetables within 50 yards of market Section 186	...	...	...	...	...	...	...	...
Unsound Food ... ... „ 192	1	...	1	50.00	...	...	...	...
Carried Forward ...	1,604	330	1,274	7,932.50	1,296	270	1,026	5,538.45

HEALTH DEPARTMENT.

Return of Prosecutions for Year ending 31st December, 1929.—Contd.

OFFENCES.	Division A. (South) Districts.				Dsviiion B. (North) Districts.			
	TOTAL.				TOTAL.			
	Prosecutions	Withdrawn	Convictions	Fines	Prosecutions	Withdrawn	Convictions	Fines
				$ cts.				$ cts.
Brought forward ...	1,604	330	1,274	7,932.50	1,296	270	1,026	5,538.45
Slaughtering Animals excepts in Abattoirs ... ,, 197	2	...	2	115.00	8	...	8	36.00
Market Byelaws	7	...	7	35.00	1	...	1	9.50
Sale of Food and Drugs Ordinance No. 139.								
Selling Adulterated Milk ... ... Section 11–1	5	...	5	59.50	9	1	8	280.00
,, Milk deficient in fat ... ... ,, 11–1								
Importing Bean Curds in Tins	5	...	5	54.50				
Q. and P. Disease Ordinance No. 157.	...	...	...	...	...	...	...	...
Failing to report case of Inf. Disease ... Section 3	...	...	...	...	2	1	1	25.00
Moving patient without permission ... ... ,, 15	...	...	...	...	...	...	...	...
Exposing patient while suffering ... ... ,, 15	...	...	...	...	...	...	...	...
Conveying patient in public vehicle ... ... ,, 19	...	...	...	...				
Carried forward ...	1,623	330	1,293	8,196.50	1,316	272	1,044	5,888.95

HEALTH DEPARTMENT.

Return of Prosecutions for Year ending 31st December, 1929.—Contd.

OFFENCES.		Division A. (South) Districts.				Division B. (North) Districts.			
		TOTAL.				TOTAL.			
		Prosecutions	Withdrawn	Convictions	Fines	Prosecutions	Withdrawn	Convictions	Fines
					$ cts.				$ cts.
Brought forward ...		1,623	330	1,293	8,196.50	1,316	272	1,044	5,888.95
Failing to have child vaccinated	,, 31	178	38	140	455.00	106	21	85	128.00
,, ,, bring child for inspection ...	,, 32	...	...	...	...	...	...	...	...
Registration Births and Deaths Ordinance No. 59.									
Failing to Register Births	Section 11	15	...	15	19.50	20	2	18	7.00
,, ,, ,, Deaths	,, 11–1	...	...	...	...	1	...	1	...
Destruction of Mosquitos Ordinance No. 174.									
Failing to comply with notice	Section 1–8	1	...	1	...	5	2	3	10.00
Recovery of costs of work done	,, 7–1	...	...	...	...	...	...	...	...
Destroying Anti-malarial Works	,, 14	...	...	...	...	...	...	...	...
		1,817	368	1,449	8,671.00	1,448	297	1,151	6,033.95

Summary.

Total Inspections	50,988
,, Prosecutions	3,265
,, Withdrawn	665
,, Convictions	2,600
,, Fines	$14,704.95

H. J. BENJAFIELD,
Chief Sanitary Inspector.

N.B.—Costs are not included in the amount of fines.